School of Educ. Lib.

MAY 23 1947

BULLETIN of the

ATOMIC SCIENTISTS . . .

VOL. 3 MARCH 1947 No. 3

Editorial—

The Soviet Amendments and Mr. Gromyko's Speech

SIX months ago, Mr. Gromyko asserted that the American control plan is "unacceptable as a whole or in its separate parts." On February 14, he agreed to use it as a basis of discussion; on February 18, he submitted twelve amendments. On March 5, he made a violent attack on certain aspects of the American plan. One will do well to disregard the invectives and aspersions—apparently considered good diplomacy by the USSR—and attempt to probe dispassionately into how far the Soviet Union has come towards acceptance of effective control of atomic weapons.

What the USSR Agrees to

ASSUMING that with the incorporation of the twelve amendments, Parts IIC and III of the Report of the Atomic Energy Commission (as reprinted on pages 87, 88 of this issue) become acceptable to the USSR, the latter appears now to agree to the following points:

Control of Both Military and Non-military Developments: International control is technologically feasible. Far-reaching identity of military and peace-time developments requires that both be controlled by a single agency.

Freedom of Inspection: Inspectors must have "unimpeded ingress, egress, and access . . . into, from and within the territory of every participating nation, unhindered by national or local authorities."

The inspection body should operate "on the basis of their own rules, which should provide for the adoption of decisions, in appropriate cases, by a majority vote."

Punishment of Violators: Unanimity rule in the Security Council is to be preserved, but violations of atomic controls can be treated as "international crimes" and Article 51 of the UN Charter can be applied to them, providing for the right of individual and collective self-defense. (It will be recalled that this Article was suggested by some commentators, for example Prof. Q. Wright in our last issue, as possible basis for a compromise on the veto question.)

"Management" is still mentioned, in the amended draft, as a method of international control, and one of the amendments requests that "inspection, supervision, and management" be promptly applied to the existing plants. This apparent acceptance of managerial control was striking, because the principle was violently assailed by Soviet commentators. Gromyko's March 5 speech left no doubt that the USSR still considers international management of atomic energy plants as a threat to her economy. He sees the Atomic Development Authority as an international cartel dominated by elements inimical to the Soviet Union.

The suggested deletion of all references to research and developmental activities indicates the same reluctance to grant the international agency positive leadership, as distinct from mere police powers.

Scientists are particularly reluctant to renounce the idea of international pooling of research. They consider the latter not only as a guarantee of a true cooperative spirit in the control agency, but also as a safeguard against clandestine activities in individual countries.

Inspection Limited

WHILE confirming the freedom of inspection, Mr. Gromyko asked on March 5 that the scope of inspection be circumscribed and not include "unlimited access to all equipment and operations." (Does this mean *all* industrial establishments or should even the right to inspect atomic energy plants be restricted?) No indications were given as to what "limited" inspection the USSR would consider proper. In the early discussions of controls in America (as reflected in many articles in the BULLETIN between December 1945 and June 1946), attention was focused on effective inspection. It was soon realized that unless control at the mines proves sufficient, inspection is likely to develop into a very widely ramified undertaking. It was to avoid such wide and irksome interference with industrial and research activities, that the Lilienthal board conceived the bold idea of monopolizing "dangerous" activities in an international agency.

In rejecting managerial control, the USSR is thrown back on control by inspection only—a method which will require more and not less inspection than the American plan.

(Continued on Page 100.)

In This Issue

The Social Task of the Scientist....70
by James Franck

Reducing Vulnerability to Atomic Bombs....71
by Ansley Coale

Scientists' Comment on Lilienthal....75

Report of Lilienthal Hearings....76

US Organization for Atomic Energy Control....79

A Critique of Planning in Science....80
by Edward A. Shils

How Far Have We Gone Toward International Control?....83
by R. Gordon Arneson

UN Security Council and Gromyko's Speech....86

UNESCO Holds First General Conference..92
by W. Albert Noyes, Jr.

"The Beginning or the End"....99
Reviewed by Harrison Brown

The Social Task of the Scientist . . . . . by James Franck

♦ A scientist's view of the social respnsibilities of his profession — the honest dissemination of truth.

TO EXPLAIN what we scientists today regard as our social task we have to clarify the situation by answering three questions. Why did we hide in the so-called ivory tower, why did we leave it, and what are we planning to do now that we have left it?

The term scientist is used in my discussion in the narrower sense. I restrict it to the class of men who devote their lives to free scientific research and who do not take an active interest in the application of the sciences to practical purposes. This group of men constitutes a kind of international brotherhood, comparable in many respects to a religious order. Their common goal is the search for truth.

It is a custom in science—and perhaps a principle—to select from the infinite reservoir of unsolved problems only those simple ones whose solution seems possible in term of available knowledge and skills. We are trained to subject our results to the most severe criticism. Adherence to these two principles results in our knowing very little, but, on the other hand, being very certain that we really know this little.

We scientists seem to be unable to apply these principles to the immensely complex problems of the political world and its social order. In general we are cautious and therefore tolerant and disinclined to accept total solutions; our very objectivity prevents us from taking a strong stand in political differences in which the right is never entirely on one side.

So we took the easiest way out and went into hiding in our ivory tower. We soothed our consciences by the thought that, after all, it is our research which forms the foundation on which the building of applied science is erected, but we felt that neither the good nor the evil applications were our responsibility.

I now come to our second question—when and how did we learn that there will be no cherished refuge for us anymore? During the war the scientist went wherever he was called and did whatever job was assigned to him, but this was considered to be a temporary arrangement lasting only for the duration of the emergency.

The position of the atomic scientists was however a very different one. After Hahn's discovery of fission and Lise Meitner's proof that great amounts of energy were released by this process, it became clear to every physicist that an odious chance existed of making a bomb of unheard-of destructive power. Since this knowledge was international, no one had any doubt that the Nazis would do everything possible to develop and use a weapon on which would decide the war—a war upon whose outcome depended the future of human existence—freedom or mental and physical enslavement.

A small group of courageous men brought the situation to the attention of our government knowing exactly what terrible consequences the successful development of such a bomb was bound to bring. But all these latent dangers had to be neglected lest the armies fighting for freedom might be the losers in this war. These scientists, and the more thoughtful among the group who joined the Manhattan Project after it was formed, had imagination to foresee that even if they were the winners in that deadly race to construct the bomb their freedom as scientists and that of pure research would be gravely endangered.

They expected the people responsible for our government to say: "We have no objections to your scientific curiosity, but if it leads you to opening the box of Pandora so that all mankind may be suffocated by the deadly fumes contained therein, then we must watch every step you take and see to it that your activities are used in a way which we men of affairs deem to be in our best interests. One cannot leave such dangerous enterprises in the hands of unworldly or even irresponsible scientists."

We scientists, however, were neither so unworldly nor so irresponsible that we did not do what we regarded as our moral duty. We stepped out of our ivory tower, though with dread and apprehension, and this step was taken not as public opinion seems to believe long after the bomb was dropped but actually considerably before that event.

And what is our duty now that we have lost our paradise? Are all the efforts of the Atomic Scientists group, are all our public speeches and lobbying merely dictated by selfish motives to get rid of the shackles which are now fastened on us? If that were the case, we would have chosen a better way out of our dilemma. We would have left nuclear research alone and turned our attention to other problems which, to us, are just as interesting.

But, alas, how can that be achieved without unity in the world? Would it help if we in the United States gave up nuclear research without having an enforceable world law imposing a world-wide moratorium on nuclear research? This can be achieved only by some kind of world government which, if established, would make a moratorium superfluous.

No, our public activities are dictated solely by our social conscience. We are trying to atone in part for our previous sins, our lack of interest in social problems. We know that the rule of secrecy, if enforced by people without intimate knowledge of nuclear physics, can do the greatest of damage. We know that imposing secrecy on results which are of only scientific interest harms and finally prevents all progress in the field of nuclear research. We admit that under prevailing political conditions a temporary protection of our country may come from secret nuclear research, but this is only a temporary and at best, partial protection.

We are trying to teach the public that it is wishful thinking to suppose that adequate protection against atomic bombs will be found. We are trying to make it clear that the construction of bigger and better bombs is to be expected which will destroy not only the populations of big towns but of whole provinces. In brief we are fighting the danger of that false feeling of security which may lure mankind again into war—a war which will depopulate the world and destroy civilization.

JAMES FRANCK, Nobel Laureate, is Professor of Chemistry at the University of Chicago. His article is a condensation of a speech given at a luncheon sponsored by the Emergency Committee of Atomic Scientists in Chicago on February 8.

Reducing Vulnerability to Atomic Attack . . .

◆ **Protective methods that may reduce the potential consequences of an attack by atomic bombs.**

. . . *by Ansley Coale*

[*The following article by the secretary of the Social Science Research Council's Committee on Atomic Energy is a condensation of a study made under the Committee's auspices. As printed here, it was delivered at the meeting of the American Economics Association at Atlantic City on January 23. The full study is to be published shortly by the Princeton University Press. The editors wish to thank the editors of the American Economics Review for permission to use this article which will also appear in a forthcoming issue of the Review.*]

ATTACKS AGAINST industrial activity and civilian populations are a commonplace characteristic of modern war; this characteristic is given new and somber emphasis by the superlative efficiency of nuclear fission as an agent of destruction. Until there is substantial evidence that the relations between great powers are no longer chronically unstable, one's attention is forced, with whatever degree of reluctance, to methods of averting or alleviating the potentially disastrous effects of attack by atomic bombs.

An analysis of protective methods cannot be divorced from speculation about the future relations between nations, and about the nature and scale of attack that might occur. Plans for protection must conform to suitable aims of national policy toward atomic weapons, aims suitable to the various circumstances which might arise. The purposes of national policy toward the military use of atomic energy may be one or more of the following:

1 To prevent the occurrence of an attack by atomic weapons.

2 To prepare to win a war involving atomic weapons, should one occur.

3 To minimize the loss of civilian life during attack, and to maximize the nation's ability to resume activity after it.

The comparative importance of these goals will depend in part on the probability of securing them. The first aim will almost always be the most important, and the others should almost always be subordinated to it. But as the likelihood of success in avoiding atomic attack vanishes, the importance of the other aims becomes more apparent.

Protective measures designed to help achieve these goals would differ according to the state of military technology, and also according to the conditions of international relationships. It would be fruitless to try to anticipate every conceivable variation of international situation. There is, however, one significant variable which in itself will have a profound effect on the future role of atomic weapons. This variable is the success or failure of the United Nations in establishing an agreement prohibiting production of atomic energy for military use.

The extreme situations would be, on the one hand, an agreement successfully prohibiting atomic weapons, and on the other, no limitation on atomic armament. The anticipated character of war, the military plans for it, and the measures which might be designed to reduce vulnerability would be quite different in these divergent circumstances.

It cannot be claimed that these polar alternatives exhaust the possibilities. It is entirely possible that the United Nations will propose an *in*effective agreement: one that pretends to guarantee against the manufacture of atomic weapons but that in fact fails to do so.

In this discussion, only the extreme conditions of a successful agreement and of no agreement at all are considered. These are analytically the most simple, though perhaps not in practice the most probable situations. An analysis of vulnerability problems under an ineffective agreement would not be profitable until the defects of an actual treaty are available for study.

The pages that follow are devoted to a discussion of vulnerability reduction as a means of avoiding atomic attack, of winning an atomic war, and of reducing civil death and destruction. The discussion is divided into two sections, one treating problems of protection under an assumption of effective international agreement, and the other treating these problems when unlimited atomic armament is assumed.

I. Vulnerability Reduction

Under an International Agreement Prohibiting the Manufacture of Atomic Weapons.

The United Nations Commission on Atomic Energy is presently endeavoring to draft a plan for the international control of atomic weapons. It is assumed in the next few pages that the Commission's efforts will be successful. The most brilliantly designed and executed plan for preventing the manufacture of atomic bombs would not destroy the knowledge that a superlative explosive can now be made, and would not forever banish the possibility that it might again be used. The sole guarantee that atomic weapons will not be employed is a guarantee that large-scale war is impossible. It is not the intention here to imply that a guarantee against war will never be achieved, nor to imply that an atomic agreement would not be an important step toward such a guarantee. It is assumed merely that proposals of the nature of those under consideration by the United Nations Commission would not in themselves remove all possibilities of war, and therefore would not entirely destroy the possibility of atomic attack.

Thus, if an agreement should be reached on limitation of atomic weapons, the problem of vulnerability would still exist.

Vulnerability Reduction as an Aid to the Prevention of Attack

The protection of essential sources of military strength, sources which are liable to destruction by a small-scale atomic bombardment, would be a contribution toward preventing attack if effective international limitation is achieved. The existence of concentrated targets of great strategic importance, such as the national capital of this country, offers an excessive ad-

vantage for abrogation of an atomic agreement.

Measures which reduced the vulnerability of such important targets would thus be a useful adjunct to the agreement itself in reducing the probability of atomic aggression. In order not to jeopardize the continuation of the agreement, vulnerability reduction should be restricted to measures which could be freely recommended to all subscribing powers.

Vulnerability Reduction as an Aid to Winning an Atomic War, Should One Occur

The international authority established to supervise the restriction of atomic weapons can hardly survive unimpaired if a war between major powers begins. The termination of its effective control would probably be nearly coincident with the start of hostilities.

The prior existence of an effective agreement would not prevent the use of atomic weapons in warfare. Rather, the agreement would eliminate the possibility of a large-scale atomic attack and counter-attack in the opening days of the war.

There would thus be two phases in a post-agreement war: a first period of uncertain duration during which atomic bombs would be unavailable for large-scale use, and a second when atomic weapons might be employed on a large and perhaps ever-rising scale.

It would be a function of the military organization to plan and prepare to win any war which might follow the termination of an atomic agreement. Military plans must take account of the probable nature of future warfare, and cannot be based on an assumption that controls which are presently successful will continue to be so. It might seem reasonable to try, during peace time, to attain a military machine strong enough to make victory sure. It might seem good military judgment to maintain in readiness non-atomic combat forces of maximum strength, and to make every possible preparation for atomic bomb production short of actual illicit manufacture. But however sensible these preparations might seem from the point of view of guaranteeing victory, they are not measures which would be viewed with equanimity were they initiated by rival powers. Such preparations would therefore be foreign to the philosophy of an agreement limiting weapon manufacture, and it is probable that they could be undertaken only at the risk of losing continued international renunciation of atomic weapons.

However, the restrictions on preparation would not prevent whatever preparations *are* tolerable from anticipating the expected character of warfare, nor would restrictions preclude the evolution of full military plans for the course to be followed should the agreement fail. A major factor in both preparations and plans would be the protection of potential military strength from destruction.

The basic principle of vulnerability reduction in the purely military sense would be to see that no major source of strength is exposed to severe damage. There are at least three elements deserving protection in accordance with this principle:

1. The active combat forces and their equipment must be protected from destruction.
2. The capacity of the nation for unified action must be preserved.
3. The production and delivery of materials for war must be insured.

The necessity to protect combat forces would require that all military equipment and personnel not directly engaging the opponent (air-fields, naval bases, arsenals, forces in training, and the like) be so dispersed and protected by structure (underground, if need be) that an attack of the strength to be reasonably anticipated would not imperil the efficiency of military action.

Preservation of unified action would call for a continuation of effective national administration and of internal communications. Excessive deterioration of morale under attack would need to be avoided. Administration might be interrupted with serious consequences because a single attack upon Washington might be able to destroy the organization needed to direct the nation at war. Designation of successors for members of the government who might be killed, relocation of various agencies, duplication of files and other equipment—these are some of the measures which might alleviate the effects of an attack on the capital. A small number of atomic bombs might hamper the cohesive performance of a nation at war by interrupting the flow of intelligence ordinarily carried by telephone and telegraph. Atomic attack against a few large cities might cause " . . . aimless, even hysterical activity, or flight"[1] in the target cities and in potential target areas. The need for continued administration and communications and for sustained morale indicates the necessity for research to discover whether in fact safeguards would be required, and to ascertain what measures would promise an important degree of safety.

An element vital to victory in modern war is the provision of munitions and supplies to the active combat forces. It is conceivable that the production and transport of these materials could precede the war; i.e., that a war could be prosecuted to a large degree from munitions and supplies accumulated in peace-time. However, the restraining effect of an agreement, together with public reluctance to support military expenditure during peace-time, would limit the accumulation of weapons before war begins. The possibility of a conflict of extended duration, the need for the war-time birth and growth of atomic bomb manufacture, and other expected changes during the war in military technique—these reduce further the possibility of conducting a war solely from accumulated munitions. It seems an unavoidable conclusion that, in a post-agreement war, a large proportion of the total munitions needs must be produced after the war begins.

It was stated earlier that the general principle of vulnerability reduction in the military sense is to make sure that no major source of strength is exposed to severe damage. This principle, as applied to industrial production, implies that no attack by hostile forces shall be able to prevent the completion of essential munitions and supplies; or, in other words, production needed for the conduct of the war should continue despite attack.

There are two preliminary sets of data needed in an analysis of protective plans for the production of war materials. The first is a description of the industrial products which would be needed during the war, and the second a description of the industrial structure required to manufacture and transport these products.

It would be nearly impossible to obtain in detail the first of these sets of data, inasmuch as one cannot foresee with precision the munitions to be used in a war

1 U.S. Strategic Bombing Survey: *The Effects of the Atomic Bombings of Hiroshima and Nagasaki.* Chairman's Office, June 19, 1946. P. 23.

in the indefinite future. However, the second set—a description of the structure of the needed war industry—depends in part on a knowledge (not in principle inaccessible) of the peace-time structure of industry.

A substantial contribution toward the analysis of industrial vulnerability could be made by maintaining a continuous and complete survey of the current industrial structure. The purpose of such a survey would be to show how *any* arbitrary group of war goods might be produced, and to find out how vulnerable to attack the production of these goods would be. This survey might consist of a series of studies of individual industrial processes, studies which would make clear both the internal characteristics of each process and its relationship to others. A single process—the production of one category of material, or of a related group of materials—might be analyzed by collecting the following information:

1 *Productive facilities for the process, and relations to other industrial production.* The present operating and idle capacity for the process should be ascertained, and the facilities convertible to the process determined. The materials and the construction time required to erect new capacity should be discovered. The uses of the products of the process in other processes and in various finished goods should be listed, as should the input materials required. Possible substitutes for the product in various uses should be recorded.

2 *The vulnerability of the process to atomic attack.* Vulnerability depends on:

a) the nature of the process itself (i.e., on the frangibility of the plants by heat and blast, on the difficulty of repair after damage, and on the protection offered workers against the anti-personnel properties of the atomic bomb);

b) the location of the plants which carry on the process (the process is vulnerable if a substantial proportion is conducted in a small number of plants, or in plants found in a few clusters each of small radius compared to the destructive radius of atomic bombs; interior locations are presumably less vulnerable than those near a border);

c) the accessibility of supplies (a process is vulnerable if atomic bombardment can easily cut off needed materials);

d) the location of the workers employed (a process is vulnerable if its labor has special skills and resides in compact areas);

e) the requirements for industrial energy (a process safe by the preceding criteria would be vulnerable if a large proportion of its plants required energy provided solely, for example, by the Columbia River dams).

3 *The suitability of various remedial measures for reducing vulnerability.* If a process is vulnerable to atomic attack, its vulnerability might be reduced by establishing a safe locational pattern, by accumulating stocks of materials at the point of intended consumption, or by providing physical protection against the destructive properties of atomic bombs. Location in a safe pattern would be easier for those industries whose capacity must be greatly enlarged in war-time, for safe location could then be part of the plans for expansion. A non-vulnerable pattern would be especially difficult to achieve where economies of scale or other special advantages of concentration are present.

The acquisition and retention (at the point of intended consumption) of stockpiles of materials required in a war economy would allow that economy to continue uninterrupted while damaged sources of supply are restored to operation. Stockpiling would probably be less expensive and politically more feasible than relocation for many processes. It would be best applicable to products easily stored and not subject to rapid obsolescence or spoilage.

Physical protection would involve construction of buildings which are blast and heat-resistant, and which afford shielding against penetrating radiation. Advantage could be taken of irregularities in terrain. The most essential facilities might be constructed underground.

A survey which supplied this information, maintained complete and up to date, would provide a background for planning the safe production of whatever materials the latest military plans would require. In other words, when the best information available about the expected severity of attack and about the requirements for production after war begins is added to the data collected by this survey, there would be a sound basis for planning the safest possible configuration of war industry.

The production and delivery of war materials might be interrupted by attacks on transportation facilities. The fact that an efficient atomic bomb must be of at least critical size implies that only major industrial targets or important transportation bottlenecks would be subject to attack so long as there are only a small number of bombs. A bomb exploded under the Hudson River might fracture the tunnels under the river and shower the docks and railroad yards adjacent to the river with radioactive spray. The devastation of a large city might restrain all traffic into the city except that required for relief.

The plans for industrial location and for stockpiling should aim at independence of transport from major cities and important bottlenecks (ports, canals, and the like). A comprehensive study of the time required to restore damaged transport facilities, of alternative routes should key centers be destroyed, and of various remedial measures is needed.

Vulnerability Reduction as a Means of Minimizing Loss of Life

The characteristic of the atomic bomb that rightfully arouses the most concern is its ability to kill. It produces (even in its demonstrated forms) many more casualties than would an attack with high explosives and incendiaries which caused an equivalent amount of damage.[2]

The danger to civilian safety follows from the existence of extensive areas of high population density, areas which offer very insufficient shelter from the deadly

[2] "If one produced the same amount of damage in two comparable cities, in one by incendiary bombing, and in the other by atomic bombing, there would be 15 times as many people injured in the second as in the first. There would be 18 times as many killed." Testimony of D. A. Terry, of the medical division of the Strategic Bombing Survey. Hearings before the Special Committee on Atomic Energy, U.S. Senate, pursuant to S. Res. 179. Part 5, Feb. 15, 1946. Page 518.

properties of the explosion. There are many places in the United States where the terrible disaster at Hiroshima could be duplicated. An additional source of danger is the vulnerability of the establishments which would be called upon to provide relief for bombed cities: hospitals, fire-fighting organizations, and the like. Still further calamity is threatened by the potential destruction of houses, food stores, medical supplies, water supplies, utilities, and other necessities for continued life in the stricken areas, and by the possible destruction or impairment of factories, tools, and personnel which would be needed for restoration and to provide essential materials after attack had ended.

Death and injury might be lessened by reducing the density of population in large urban areas by any feasible method, by building deep shelters of sufficient size to house a large proportion of urban populations, by planning emergency medical care and other disaster relief, and by encouraging the construction of blast-heat- and radiation-resistant buildings. The permanent reduction of density in urban centers would involve unprecedented government intervention if done rapidly and on a large scale. Some improvement could be achieved by careful planning of slum clearance and other government housing projects, and by encouraging dispersion through various forms of subsidy. Perhaps the most feasible method of reducing the concentration of population would be a non-permanent evacuation of substantial numbers from large cities at the beginning of a post-agreement war. The prior existence of a limitation on atomic weapons would provide a brief period for such evacuation—a period during which atomic bombs would not be used in large numbers.

II. Vulnerability Reduction

When Atomic Armament is not Limited by International Agreement

It is assumed in the paragraphs that follow that there is no treaty limitation on atomic armament. It is further assumed that technical limits would allow a rate of production of atomic bombs (of the sort already used) of hundreds per year, and that a major power could accumulate thousands no more than a decade after it had started large-scale production. Finally, it is assumed that the great powers would fully exploit the technical possibilities. What would be the problems of vulnerability after the accumulation in several nations of thousands of atomic bombs?

In a post-agreement war, large-scale attacks (for example, with more than ten bombs) would not occur before the passage of some interval after the termination of effective control; and such a war might be ended before more than a hundred or so bombs had been used. In contrast, any war following the multilateral accumulation of thousands of atomic bombs would quite possibly open with reciprocal attacks of terrible magnitude. Under the latter assumptions, then, the reduction of vulnerability must have been completed at the time war starts, and protection must have been provided against a very large-scale attack.

The Prevention of Atomic Attack

It is to be presumed as a corollary of the absence of international limitation that each major nation must rely primarily on its own actions to avoid war and thus to avoid being subjected to atomic bombardment. The method of avoiding war that most naturally suggests itself in these circumstances is to prepare an atomic counter-attack of maximum proportions, and furthermore to provide safeguards which would insure that the counter-attack could be delivered after reception of an initial bombardment. More exactly, the measures giving perhaps the best guarantee obtainable against attack would be, in the absence of treaty limitations, synonymous with preparations for victory in an atomic war—"victory" in the formal sense of the imposition of surrender on an opponent. The important motive for preparing to win an atomic war would be to avoid having to prove that the preparations had been successful.

Vulnerability Reduction as an Aid to Winning Any War That Might Occur

The general pattern of preparation imposed by the prospect of an early large-scale exchange of holocaust would be to maintain in constant readiness all of the elements needed for effective military action (particularly for a major atomic counter-attack); to keep these elements protected from destruction by the most extreme precautions; and to make them as independent as possible of the remainder of the national community, which might become completely disorganized under a major atomic attack. The details of this pattern would involve, for example, full replacement during peace-time of military air conveyances with later models whenever an important improvement is made, and similar re-equippage of the defensive forces following each major innovation in techniques of defense. The stocks of atomic bombs, the carriers for the bombs, and other important components of military force would need to be widely dispersed, and protected by the safest achievable structures (presumably underground).

In the interest of brevity, the protection of only the production of military equipment will be discussed here, as illustrative of the contrast between the reduction of military vulnerability under the present assumption of unlimited armament and under the earlier assumption of atomic agreement.

In view of the probable decisive magnitude of the early attacks, the primary method of protection for the production of military material would be to complete that production in advance of the war. A dispersed and protected stock of products suited to the latest military plans should be maintained—a stock large enough to meet all the anticipated needs for military action.

However, the war may not have been decided before such stocks are exhausted, or the war might start before a sufficient quantity of some decisively novel weapon or implement of war had been accumulated. Therefore, as provision for a war of moderate duration, the factories engaged in the direct production of munitions should be so protected that they can continue under attack. Protection of these plants would call for wide dispersion, underground construction, for large accumulation of the input materials used in production, and perhaps protected dormitories adjacent to the factories, stocked with food.

The longer the war, the more likely that accumulated weapons would prove inadequate, that strategic developments would demand unforeseen munitions, and that industrial production during the war would decide the outcome. It would therefore be desirable to extend extreme meth-

(Continued on Page 98)

Scientists Comment on Lilienthal . . .

The controversy over Mr. Lilienthal has brought from scientists some comment which is noteworthy because it is not political: atomic research and development are practically at a standstill. Responsible leadership is needed. If Lilienthal is not confirmed the resulting delay may throw our work back by several years.

President K. T. Compton of the Massachusetts Institute of Technology states:

"Having known Lilienthal more or less for about a dozen years, and having been in conference with him several times since his appointment to the Atomic Energy Commission, I am convinced not only that he is well qualified for the post, but also that I would know no one as well qualified and possibly available.

"However, my concern with the situation goes deeper than the fate of Lilienthal himself. He has won the respect and backing of the key people in the atomic energy development. Among them there is, so far as I can judge, a universal feeling of disillusionment and disgust over the manner in which the case has been handled by the Senate. If this should lead finally to failure to confirm him, I believe it will be a very serious blow to our future progress in the atomic energy field, especially in the direction of its practical application to industrial and military objectives.

"This development is in the nature of the case dependent primarily upon the work of the nuclear physicists, chemists, and a very few research engineers, on whose findings the practical application must be built.

"Already the projects at Oak Ridge and Los Alamos have been severely reduced in effectiveness by the withdrawal of a large portion of the scientific personnel after the war. The shortage of competent scientists and the competition for their services are very great indeed, and practically all of the key men have many other offers and most of them still on the job have stayed there from a sense of duty.

"If, however, they become disillusioned or gain the impression that political or special interests are getting control of the program, I believe that it will collapse into a rather hollow shell. This, it seems to me, is the fundamental threat. Considerable harm has already been done, but I believe that much greater harm will be done if the confirmation is not made.

"We can talk glibly, both nationally and internationally about a great atomic energy program but it will be relatively empty talk unless this program is carried on with enthusiasm."

Enrico Fermi usually spends all his time on physics. He hardly ever discusses a political question. But in the recent past he did give an interview about Lilienthal. We quote from his statements:

"It is essential that the man at the head be endorsed by the people who are supposed to do the field work. Lilienthal has a good record. All the commissioners are sound people who will do a good job.

"Since the end of the war, progress in atomic research has been exceedingly slow while we have been waiting for what sort of management there will be. It will take time to get the program set up. I do not think we can afford the price of further delay.

"The commission was named last October. The start of its work has been delayed about six months. Should the senate reject Lilienthal, it probably would take six months to get a new man and another six months for the commissioners to get their bearings. The lack of certainty as to how things should be run and who should run things has been a deterrent and has done no end of damage.

"Russia is behind us now, but she may pass us."

A most concise statement of the issue came from *Harold Urey:*

"Many of my colleagues are deeply disturbed over the possibility that the Senate may decline to confirm the Chairman of the Atomic Energy Commission. I share their concern. I believe that atomic energy work in the United States will be crippled for several years if the chairmanship of the Atomic Energy Commission is changed at this time.

"Eighteen months have now passed since Hiroshima. During this time the work on atomic energy in the United States was virtually at a standstill because there was no one who could take the responsibility for major decisions. Many of the projects badly disintegrated during this period. Other projects are still held together by the hope that a responsible management will soon be established. The Lilienthal Commission took over the operations on the first day of January having previously made a study of the problems of operating these projects. If the Chairman of this Commission should be refused confirmation now, another six months will pass before orderly operation of atomic energy research will get underway. During this time, these projects may collapse, and the work on atomic energy in this country will be wrecked at a time when other nations are making rapid progress in this field. The scientists hope that Congress will keep party politics out of the vital issue of atomic energy."

These are but a few samples. Other men eminent in science and in academic life made statements in support of Lilienthal. Among these are Conant, Bush and A. H. Compton. I do not recall any issue on which scientists were as unanimous as they are now. When the bill on atomic energy control was debated, the majority of scientists favored the McMahon bill, which now has become law. But there were some dissenting voices from leading scientists. On the Lilienthal issue, everyone agrees who is in possession of the relevant facts and who looks on atomic development as a concrete, difficult and urgent job.

Let us hope that Mr. Lilienthal and his colleagues will be given the opportunity to do this job.

Senate Committee on Atomic Energy Interrogates Lilienthal and Other Commissioners

IN THE LAST ISSUE, we reported the first two days of hearings before the Senate Committee considering Mr. Lilienthal's appointment as Chairman of the Atomic Energy Commission. Immediately following, on January 28 and 30, the four other designated Commissioners, Merrs. Bacher, Strauss, Pike and Waymack were interrogated by the Senate Committee. All supported the policies outlined by Mr. Lilienthal and said that they intend to work as a unit, and not divide the responsibilities between them.

All appointees stressed their appreciation of the military value of atomic energy and readiness to co-operate with the military.

The Commissioners were also asked about their attitude towards private enterprise in the industrial development of atomic power. To this question, the retired Admiral, L. L. Strauss (1917-1919: Private Secretary to Hon. Herbert Hoover, U. S. Food Administration; 1929-1941: Partner of Kuhn Loeb and Company, Bankers; 1941-1946: Special Assistant to the Secretary of the Navy; Navy Member of the Executive Committee of the Army-Navy Munitions Board), answered:

I consider that this force and this art is of a nature so revolutionary that it has been found by the Congress not to fit into the scheme of private enterprise to which we have been accustomed and upon which I have been reared. I regard the task of the Atomic Energy Commission as a high public trust: that of being in custodianship of that charge until those problems are resolved to the point where the American pattern can be applied to this subject as well as to any other branch of science or industry.

Mr. Sumner Pike (formerly Vice-President and Director, Case Pomery Company of New York, member of the Securities and Exchange Commission) was asked if he had formed a substantial conclusion as to the general field of activity of this Commission, and replied: This is the only job I ever tackled which seemed farther out of reach now than it did the day I looked at it.

In the first two or three weeks we were on the Commission we were exposed to short talks by thirty-five or forty enthusiastic scientific specialists engaged in different ramifications of this job. If there is one thing that was left with me afterward, it was that each one of them seemed to feel more possibilities, probabilities, and almost certainties, that required investigation, so many that all they needed was more men, more money, and more time.

I honestly came back with the feeling that if we could transmit to the Congress the great, apparently well based, enthusiasm so that the Congress would appropriate the money that these people needed, we would more than half fill the job.

He was then asked: How do you feel about the matter of secrecy in connection with atomic energy?

Mr. Pike: Security is perhaps the most important duty, and is something we have got to preserve. And I will also go so far as to say I do not like the general idea. I do not think most American people do.

The Chairman: Would you find yourself inclined to yield, in the face of that peacetime pressure? To relax the safeguards against essential security?

Mr. Pike: No, sir. I am afraid that my New England background would probably lead me to lean over backward in the other direction more than I should.

Senator Vandenberg: Do you think we could have a little too much security, maybe?

Mr. Pike: Well, Senator, there is this point: that, let us say some work has been done on the biological and purely scientific phases and it is pretty hard to link some of that work up with weaponeering. I am saying that I am afraid I might be a little too conservative in letting that out, and might have to face some of the criticism that comes up very quickly.

Because after all, people in scientific work, particularly in university work, really make their standing in their profession by their publications, by the work they are known to have done, work that other people can verify and use as a basis and carry on from there. And you are affecting the life of a great many fine people when you withhold things, and you ought not to do it without good reason.

Senator Vandenberg: Well, all that you say about scientists is true. They are a thoroughly splendid group, and they would not be true to their own aspirations if they were not pressing you constantly. But I hope you will welcome any criticism you get for standing up for security until we get out of the woods.

Mr. William W. Waymack (publisher of the Des Moines Register and a Director of the Carnegie Endowment for International Peace) was questioned about the relation between the Carnegie Foundation plan* and the Lilienthal-Baruch proposals.

Mr. Waymack: I think the major difference is that the recommendations of that Carnegie committee put more emphasis upon control through separate national commissions, with supervision, by an international commission. I may add that that report, as I understand it, was not concurred in by all the members of the committee.

As of now—and I have had a bit of education in the last three or four months —I unhesitatingly state my preference for the approach represented by the Acheson-Lilienthal report; and, as I understand it, broadly represented by the American Government's position.

Senator Bricker then asked why one should go through a procedure of "giving the atomic bomb" to an international agency; would it not be better to make an international agreement outlawing the military use of the bomb? Mr. Waymack answered that this is precisely the Russian

* See Bulletin Vol. 2, No. 1-2

proposal, and that he would not want to put his trust in a treaty of the type of the Kellogg pact.

It seemed that Senator Bricker, a new member of the Committee, was entirely unfamiliar with plans for international control, including the official American plan.

Senator Johnson (Colorado) inquired whether the budget of the Commission (444 millions) and its personnel (44,000) could not be trimmed. Mr. Waymack pointed out that only about 5,000 are employees of the Commission, others being on the payroll of various contractors.

Senator Johnson: As a member of this Commission, would it be your policy to cut expenses to the bone?

Mr. Waymack: It is a little hard in this case, Senator, to know where "the bone" is.

Senator Johnson: However, I have been impressed by the fact that at Oak Ridge, for instance, we are carrying on an organization that is more or less obsolete.

Mr. Waymack: There actually is in process now curtailment of some operations, as has been publicly announced, for reasons of economy.

Senator Knowland: Is it not, however, important that this nation have sufficient funds available, so that we can keep, if you please, four or five jumps ahead of the rest of the world in the atomic field for peaceful purposes?

Senator Johnson: I challenge anybody to go to Oak Ridge and not see where millions and millions and millions of dollars have been wasted and are being wasted at the present time.

Now, the Congress has poured out billions on faith. From now on, we are going to have to have some facts and figures and be told what is happening, and how the money is to be expended.

Mr. Carroll Wilson, the designated General Manager, answered questions about organization plans.

Mr. John M. Hancock, advisor to Mr. Baruch when the latter was U.S. Representative in the U.N. Atomic Energy Commission, was the first witness on January 31. Asked about his opinion of the appointees, he first talked on some differences between the "Lilienthal plan" and the "Baruch plan," (the more complete international ownership of uranium ores according to the first one; and the more far-reaching control of dangerous industrial activities according to the second one), and concluded with the following endorsement of Mr. Lilienthal. "I have seen a good mental capacity, and ability to get hold of difficult problems. So far as his dealings with us have been concerned, he has been very open-minded and very fair minded."

His endorsement of Messrs. Strauss and Bacher was much more emphatic.

On February 3, **Mr. Bernard Baruch** also gave a rather lukewarm endorsement of Mr. Lilienthal.

Mr. Baruch: I know three members of the Commission, one of whom worked with me in the Atomic Energy Commission, Dr. Bacher. I would speak of him only in the highest terms. Dr. Bacher is thoroughly qualified.

I have known Lewis Strauss ever since World War I, when he was Secretary to Mr. Hoover, and in all of his work since, and I know he is thoroughly qualified.

The Chairman of the Commission, Mr. Lilienthal, I have known for some time, and I think he is a well qualified man. He is a man of prodigious energy, of driving force. I think sometimes that in his conception of his duty he drives exceedingly hard; and sometimes he perhaps makes enemies or creates misunderstandings. He never has any with me, but I understand he has had some with my dear friend, Senator McKellar, whom I have known for 31 years, and for whom my affection and admiration have grown each year.

I have had a closer and more affectionate relationship with Mr. McKellar than I have with Mr. Lilienthal. But Mr. Lilienthal is thoroughly qualified, a good manager, knows his subject. I would say he is a man of integrity and a man of ability, and I think a fine public servant.

Senator Johnson: Do you know General Farrell, who had considerable to do with atomic energy development? Would General Farrell make a good general manager for this Commission?

Mr. Baruch: I could not think of a better man. I do not like to advocate any particular man, but you happened to strike on one of my favorites.

Senator Johnson: In your very grave responsibilities of working out international control, have you had the full cooperation of Mr. Lilienthal at all times?

Mr. Baruch: When their report was first made, I had not been appointed. At first, there seemed to be some difference of opinion. They seemed to want to go just so far on control and inspection and reporting. I wanted to go further. Later on, in about a month, Mr. Lilienthal came to see me and most generously offered his cooperation—and not only offered it but gave it. I think every member of this Commission and everybody connected with it ought to advocate what the President and the Secretary of State have approved as the American position.

Senator Johnson: In your difficult task, internationally speaking, have you been handicapped in any way by the disclosures which have been made by the Smyth report?

Mr. Baruch: I think if what I saw was the correctly recorded view of Mr. Lilienthal, I would agree with him.*

Senator McMahon: But the Smyth report was given out by the Army, was it not?

Mr. Baruch: But I want to tell you that before they did that the scientists certainly tore into them.

As for this Groves, for whom I have the highest respect, I think justice has never been adequately given to this man, who has undertaken the most unparalleled, unprecedented, and impossible job of making the atomic bomb. He had to fight industrialists, scientists, and everybody else in the world. They made that poor fellow's life miserable.

While the military gave it out, they (the scientists) certainly lambasted them before they got anything out of them.

Senator Johnson: You think, then, that the Smyth report came out from the military under tremendous pressure?

Mr. Baruch: Oh, yes, sir. I think they will all tell you that.

And there is the natural desire on the part of a scientist to free science. Because that is the way they feel: They want to

* See Bulletin Vol. 3, No. 2, page 44 and Editorial.

use it for the benefit of mankind. I am in favor of that, but I do not want to use it for the benefit of somebody whereby they can destroy mankind. That is the difference between the scientist and the military man.

The Chairman: At least one group of scientific opinion believes that if you free all of this knowledge, this will act as a pacifier to other countries and they then in gratitude will not use that knowledge against us.

Mr. Baruch: That view is so nauseating to me that I never understood it, Senator.

Senator McKellar: Were you not astounded when you learned, through the newspapers, that this Commission had been formed, leaving General Groves and General Farrell and all the others entirely out and putting it in the hands of an entirely new set up of men?

Mr. Baruch: Well, what astounded me was that Congress passed a law that made that necessary. You cannot speak too highly of Groves for me, because I have great admiration for him. And I would like to see him get those two stars, and I hope you gentlemen will see that he gets them.

Senator McKellar: You said you were for Mr. Lilienthal because he has "full knowledge of atomic energy." Do you know that he never knew anything about atomic energy until the bomb fell on Hiroshima?

Mr. Baruch: That Acheson-Lilienthal report was a very remarkable report, Senator. I wish they had held it up until I was made American representative, because I would like to have toned it down a little.

Senator McMahon: Mr. Baruch, I want to be fair, too, but General Groves was working under security. This was the most precious information, as you and I know, that was in this country's possession. No matter what the pressures were, he did authorize the release of it.

Conant, Bush, Compton Endorse Strongly

On February 4, **Dr. James B. Conant,** President of Harvard University, endorsed strongly the appointments, particularly that of Mr. Wilson as general manager.

On February 6, **Dr. Vannevar Bush** stressed the similarity between the functions of the war-time Office of Scientific

(Continued on Page 94)

'That I Deeply Believe'

Lilienthal Defines Democracy for Senator McKellar

David E. Lilienthal's spontaneous answer on February 4 to one of Senator Kenneth D. McKellar's oft-repeated queries about his alleged "Communist" doctrines has — in a few short weeks — become one of the classic affirmations of democratic principles. Editorialists have likened it to Lincoln's Gettysburg address and have predicted that it will be studied in schools generations hence. He said:

My convictions are not so much concerned with what I am against as what I am for—and that excludes a lot of things automatically.

Traditionally, democracy has been an affirmative doctrine rather than merely a negative one.

I believe in — and I conceive the Constitution of the United States to rest upon, as does religion — the fundamental proposition of the integrity of the individual; and that all government and all private institutions must be designed to promote and protect and defend the integrity and the dignity of the individual; that is the essential meaning of the Constitution and the Bill of Rights, as it is essentially the meaning of religion.

Any form of government, therefore, and any other institutions, which make men means rather than ends, which exalt the state or any other institutions above the importance of men, which place arbitrary power over men as a fundamental tenet of government, or any other institutions, are contrary to this conception; and therefore I am deeply opposed to them.

The Communistic philosophy, as well as the Communistic form of government, fall within this category, for its fundamental tenet is quite to the contrary. The fundamental tenet of Communism is that the state is an end in itself, and that therefore the powers which the state exercises over the individual are without any ethical standards to limit them. That I deeply disbelieve.

It is very easy simply to say one is not a Communist. And, of course, if my record requires me to state that very affirmatively, then it is a great disappointment to me. It is very easy to talk about being against Communism. It is equally important to believe those things which provide a satisfactory and effective alternative. Democracy is that satisfying affirmative alternative.

And its hope in the world is that it is an affirmative belief, rather than simply a belief against something else, and nothing more.

One of the tenets of democracy that grow out of this central core of a belief that the individual comes first, that all men are the children of God and their personalities are therefore sacred, carries with it a great belief in civil liberties and their protection and a repugnance to anyone who would steal from a human being that which is most precious to him, his good name; either by imputing things to him, by innuendo, or by insinuation.

And it is especially an unhappy circumstance that occasionally that is done in the name of democracy.

This I think is something that can tear our country apart and destroy it — if we carry it further.

I deeply believe in the capacity of democracy to surmount any trials that may lie ahead provided only we practice it in our daily lives.

And among the things that we must practice is that while we seek fervently to ferret out the subversive and anti-democratic forces in the country, we do not at the same time, by hysteria, by resort to innuendo and sneers and other unfortunate tactics, besmirch the very cause that we believe in, and cause a separation among our people, cause one group and one individual to hate another, based upon mere attacks, mere unsubstantiated attacks upon their loyalty.

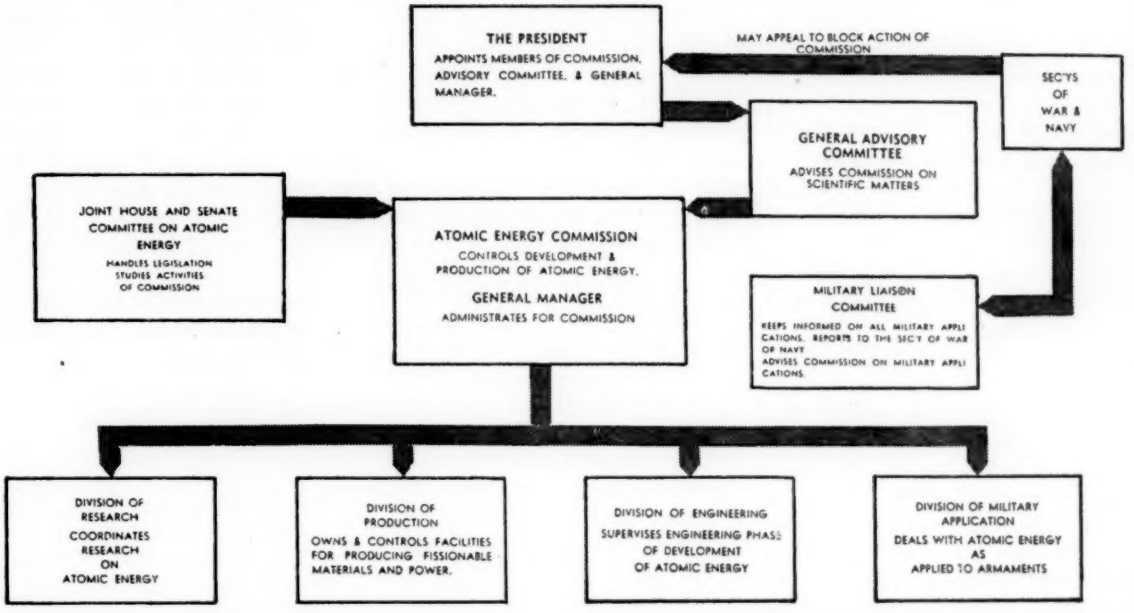
I want also to add that part of my conviction is based upon my training as an Anglo-American common lawyer. It is the very basis and the great heritage of the English people to this country, which we have maintained, that the strictest rules of credibility of witnesses and of the avoidance of hearsay and gossip shall be excluded in courts of justice.

And that, too, is an essential of our democracy.

And whether by administrative agencies acting arbitrarily against business organizations or whether by investigating activities of the legislative branches, whenever those principles fail, those principles of the protection of an individual and his good name against besmirchment by gossip, hearsay, and the statements of witnesses who are subject to cross examination; then, too, we have failed in carrying forward our ideals in respect to democracy. That I deeply believe.

Silence followed his remarks for several moments, then Senator McMahon said in a quiet voice, "That was the statement of a very real American."

U.S. ORGANIZATION FOR ATOMIC ENERGY CONTROL


THE PRESIDENT
APPOINTS MEMBERS OF COMMISSION, ADVISORY COMMITTEE, & GENERAL MANAGER.
MAY APPEAL TO BLOCK ACTION OF COMMISSION
SEC'YS OF WAR & NAVY
GENERAL ADVISORY COMMITTEE
ADVISES COMMISSION ON SCIENTIFIC MATTERS
JOINT HOUSE AND SENATE COMMITTEE ON ATOMIC ENERGY
HANDLES LEGISLATION STUDIES ACTIVITIES OF COMMISSION
ATOMIC ENERGY COMMISSION
CONTROLS DEVELOPMENT & PRODUCTION OF ATOMIC ENERGY.
GENERAL MANAGER
ADMINISTRATES FOR COMMISSION
MILITARY LIAISON COMMITTEE
KEEPS INFORMED ON ALL MILITARY APPLICATIONS. REPORTS TO THE SEC'Y OF WAR OR NAVY
ADVISES COMMISSION ON MILITARY APPLICATIONS.
DIVISION OF RESEARCH
COORDINATES RESEARCH ON ATOMIC ENERGY
DIVISION OF PRODUCTION
OWNS & CONTROLS FACILITIES FOR PRODUCING FISSIONABLE MATERIALS AND POWER.
DIVISION OF ENGINEERING
SUPERVISES ENGINEERING PHASE OF DEVELOPMENT OF ATOMIC ENERGY
DIVISION OF MILITARY APPLICATION
DEALS WITH ATOMIC ENERGY AS APPLIED TO ARMAMENTS

Personnel of U.S. Atomic Energy Organization

Atomic Energy Commission

David E. Lilienthal, Chairman, former Chairman of the Tennessee Valley Authority.

Robert F. Bacher, formerly Associate Director of Los Alamos Laboratory and Prof. of Physics and Director of the Laboratory of Nuclear Studies, Cornell University.

Sumner T. Pike, former member U. S. Security and Exchange Commission.

Lewis L. Strauss, former Admiral, U. S. Navy, member of Interdepartmental Committee on Atomic Energy.

William W. Waymack, Editor of *Des Moines Register and Tribune.*

General Manager and Staff

Carroll L. Wilson, General Manager, wartime assistant to Dr. Vannevar Bush, head of Office of Scientific Research & Development and secretary to State Department Committee which drew up the Acheson-Lilienthal Report.

John A. Derry, Ass't to General Manager, former Deputy Chief, Military Operations Division, Manhattan Project.

Richard O. Niehoff, Ass't to General Manager, former Director, Administrative Relations Division, National Housing Agency.

G. Lyle Belsley, Director of Organization and Personnel, former Ass't Administrator, National Housing Authority.

Herbert S. Marks, General Counsel, former Ass't General Counsel, TVA, and former Special Ass't to Under Sec'y of State Acheson.

Edwin E. Huddleston, Jr., Deputy to General Counsel, former Director, Special Projects Staff, State Dep't Office of Research and Intelligence.

Joseph Volpe, Jr., Deputy to General Counsel, former Special Ass't to Major General Leslie Groves, Commanding General, Manhattan Project.

Paul W. Ager, Budget Director, former Chief Budget Officer, TVA.

Frank J. Wilson, Consultant on Security, former Chief, U.S. Secret Service.

Division of Research

James B. Fisk, Director, former Ass't Director of Physical Research, Bell Telephone Laboratories.

Division of Production

Walter J. Williams, Director, former Colonel U. S. Army, Director of Operations, Manhattan Project.

Division of Engineering

Director's appointment not yet announced.

Division of Military Applicaton

Col. James McCormack, Jr., U. S. Army, Director, former Chief of the Politico-military Survey Section in the Army's Plans and Operations Division.

Labor Consultants to AEC

George H. Taylor, University of Pennsylvania, former Chairamn of War Labor Board.

Lloyd K. Garrison, N. Y. City attorney, former General Counsel, War Labor Board

David A. Morse, Ass't Sec'y of Labor

(Continued on Page 82)

A Critique of Planning—The Society for Freedom in Science

◆ **British scientists organize to stop the trend toward governmental planning in science.**

. . . by Edward A. Shils

I

THE GREAT DEPRESSION, which presented the spectacle of unemployment alongside the destruction of unsold foodstuffs and which promoted the growth of friendly interest in the Soviet Union, stimulated among British scientists a dissatisfaction with the existing social order which was manifested in a variety of ways. Many felt that science was not being adequately utilized for the benefit of mankind, that the capitalistic order in Great Britain was frustrating science by preventing its benefits from reaching society at large while scientists were being put to work on military problems.

British scientists, moved by their new sense of social awareness and responsibility, turned against "pure science" both denying that there is any such thing and asserting that if it does exist it is a superfluous self-indulgence which does not merit the support of Society or the State. At the same time the spread of Marxism among British scientists, partly arising from their new political concern and partly stimulated by the series of papers delivered by the Soviet delegates to the International Congress on the History of Science in London in 1931, (in particular, the paper by B. Hessen, on "The Social and Economic Roots of Newton's 'Principia' ") led an important bloc of British scientists to support the Marxist theses that all scientific work, however "pure" it might appear, is a witting or unwitting response to the practical problems confronting the society or the ruling classes of the society in which the scientists live.

From these several premises, there developed an insistence on the "planning of science". The writings of J. D. Bernal *(The Social Function of Science)*, J. G. Crowther *(The Social Relations of Science)* and Lancelot Hogben *(Science for the Citizen)* were the chief literary witnesses of this attitude. The Association of Scientific Workers and the Division for the Social and International Relations of Science of the British Association gave their organized support to the movement. The "planning of science" was intended to involve the determination by a central body of the problems on which scientists should work, the criteria of selection being the practical—economic or welfare—utilizability of the expected results of the research. The experience of the Soviet Union on the planning of science was cited as an inspiration and a precedent.[1]

This point of view was definitely preponderant among British scientists during most of the 1930's and there was practically no opposition until 1940, when a letter was sent to 49 scientists suggesting the formation of a Society for Freedom in Science.[2] A small group subsequently met to draft a program for the Society which was then circulated in May and June 1941. This program contained the following propositions:

"1 The increase of knowledge by scientific research of all kinds and the maintenance and spread of scientific culture have an independent and primary human value

"2 Science can only flourish and therefore can only confer the maximum cultural and practical benefits on society when research is conducted in an atmosphere of freedom

"3 Scientific life should be autonomous and not subject to outside control in the appointment of personnel or in the allocation of funds assigned by Society to Science

"4 The conditions of appointment of research workers at universities should give them freedom to choose their own problems within their subjects and to work separately or in collaboration as they may prefer. Controlled team work, essential for some problems is out of place in others. Some people work best singly, others in teams and provision should be made for both types

"5 Scientists in countries not under dictatorial rule should cooperate to maintain the freedom necessary for effective work and to help fellow scientists in all parts of the world to maintain or secure this freedom."[3]

The Society has a membership (as of June 1946) of more than 450 scientists of whom 230 reside in Great Britain, and 176 in the U. S. Its governing committee consists of the following scientists: J. R. Baker (Sec.), V. H. Blackman, J. A. Crowther, R. Brown, M. Polanyi, L. E. Sutton, A. G. Tansley. In the United States, the Society is represented by P. W. Bridgman. The Society has published a series of Occasional Pamphlets.[4] Its members are active in attempting to influence the science-policy of the Government.

II

The Freedom in Science movement reaffirms (1) a clear and fundamental distinction between pure and applied science, and (2) the conviction that knowledge of the laws of Nature is a good in itself.

Pure science consists of a systematic body of valid propositions. Prof. Polanyi emphasizes the systematic and cumulative character of these propositions.[5] It is in their relevance to the systematic structure that single facts acquire interest, however momentous these facts themselves may be for the practical ends of men. He

EDWARD A. SHILS, on leave from the University of Chicago where he is Assistant Professor of Sociology, is now Reader and Lecturer in Sociology at the London School of Economics.

1 Prof. Michael Polanyi believes that this comprehensive planning of science has been abandoned in the Soviet Union. He refers to a speech by Kapitza given in 1943 in which the distinction between pure and applied science is reasserted and the necessity for freedom in pure science proclaimed. cf *Political Quarterly* XVI (4) Oct.-Nov. 1945, p. 327.

2 cf. Tansley, AG and Baker, S.R. "The Course of the Controversy on Freedom in Science" *Nature*. Vol. 158, (4017) 26 Oct. 1946. pp. 574-576. cf. also The Editorial in this issue, in which while in the main espousing the viewpoint of the Society, *Nature* seeks to soften the Society's critique of the Soviet Union's treatment of scientists, and to conciliate the various currents of thought in British science "... though we claim that the impact of Science on Society is now achieving such importance as to command constant study which is bound to result in conscious planning, we are equally convinced that it is the man of science who must be allowed to do the planning in consultation with others" (ibid p. 566)

3 *The Objects of the Society for Freedom in Science*. 2nd Edition Oxford 1946. pp. 4-5.

4 No. 1. Is the Progress of Science Controlled by the Material Wants of Man? by F. Sherwood Taylor. 1945.
No. 2. Rights and Duties of Science, by Michael Polanyi. 1945.
No. 3. Free Science, by Warren Weaver. 1945.
No. 4. The Planning of Science, by Michael Polanyi. 1946.
No. 5. The Future of Science and Technology, by N. S. Hubbard. 1946.
(Obtainable from J. R. Baker, University Museum, Oxford)

5 Michael Polanyi, "Rights and Duties of Science," Occasional Pamphlet No. 2.

grants that the intrinsic importance of events makes them more interesting to deal with scientifically but this does not give them scientific importance.

Practical knowledge may be either entirely empirical or it may be applied scientific knowledge. Practical or applied scientific work has produced very little insight into the laws of nature. This means that pure scientific knowledge, the role of which in modern industrial technique is often overestimated by the proponents of "applied science" can not be fruitfully sought as a means to the solution of practical problems. To follow such a program would deter us from acquiring deeper insight into the laws of nature and even the ultimate contribution of pure science to the realization of practical ends.

To attempt to confine science to the solution of immediately important problems of health and material welfare assumes both the predictability of "society's needs" and the practical implications of pure scientific discoveries which have not yet been made. Prof. Polanyi, writing in 1939, said that up to that time the great achievements of physics in the 20th Century embodied in the work of Planck, Einstein, Rutherford and Bohr had given rise directly to only one practical invention, namely, the electric discharge lamp, used in the illumination of highways.

He posed this problem for the planners of science: had they been in power over scientific work in 1900, would they have foreseen the need for the new developments in highway illumination which would be required by the widespread use of automobiles—and if they had foreseen the need would they have also foreseen that the discoveries of Planck, Einstein, Rutherford and Bohr would have enabled this need to be met? "And then the crucial question: Supposing the likely case that the scientific world controllers had not performed this miracle of foresight, would they then have had to reduce their support of the investigations which were leading to the discovery of atomic structure?"[6]

Attempts by non-scientists or by scientist-administrators to set the problems for scientists to investigate—excluding of course team research with completely voluntary recruitment of team members —will threaten the development of science altogether. A compromise solution which leaves science "half free" is likely to result in "the stimulation of comparatively meager investigations similar to those that are called forth nowadays by the large endowments given to special fields—as in the case of cancer research. I doubt whether these endowments have promoted to any considerable extent the scientific understanding of even the treatment of cancer since the main progress concerning both has been achieved in principle by workers outside the domain of cancer endowments. This could not be otherwise, because 'cancer research' does not form a branch of science based on a specific system of ideas."

[6] Polanyi, Michael, "Rights, Duties of Science," p 13.

III

The counterattack of the Society for Freedom in Science has gone further than the reaffirmation of the distinction between pure and applied science and the denial of the possibility of the fruitful planning of pure science. It has led on the one hand to a reexamination of the Marxist interpretation of the history of science (by F. Sherwood Tayler, the Curator of the Museum of the History of Science at Oxford) ("The Growth of Thought in Society" Prof. Polanyi, *Economica* VIII (NS) Nov. 1941 (pp. 428-456) and on the other hand to a sociological and philosophical amplification of the nature and conditions of the freedom of science, and of the relationship of the respect for the freedom of science and the value of truth to moral attitudes in general.[7]

The sociological basis of this defence of freedom in science is the distinction between "corporate" organization and "dynamic order" as the two major processes for achieving order and coherence in society. The former is hierarchal, limits initiative and operates through command.

Dynamic order is characterized by the absence of unilateral commands: it works through initiative and compromise within the framework of a commonly accepted set of standards or rules and through the patterns of judgment exercised but not imposed by a stratum of "influentials" (M. Polanyi's term) whose legitimate prestige gives their expression especial consideration and weight in the judgments of the other members of the "dynamic order." Illustrations of dynamic order are found in voluntary and professional bodies, in the literary world, in the Common Law judiciary and par excellence in the world of science.

Two quotations from Michael Polanyi's "The Growth of Thought in Society" will perhaps make clear what is meant: "They (the 'influentials') rule according to law; assessing values according to the standards accepted and publicly acknowledged as the bases of all activity in their own field. Without such traditional standards, no creative work and no dynamic order is possible. Mental creation means an act of thought or of art or of practical craftsmanship that can be proved valid by some preexisting standards. While every new creative effort changes somewhat the framework to which it is assimilated, every such modification is based on the continued persistence of some wider criteria of validity, in the light of which the minor change is being approved. Take science. New discoveries are frequently upsetting the scientific outlook of the day and modifying scientific standards, yet these discoveries are accepted by science —though sometimes after a lengthy period of discussion—in accordance with a wider scientific outlook and a wider aspect of scientific standards which they are found to satisfy." *(Economica,* Vol. VIII (NS) Nov. 1941. p. 441).

"...Their growth (i.e. the growth of dynamic orders) takes place through the life and action of the community of specialists in charge. It is a democratic life, conducted publicly under the voluntarily accepted laws of this circle. Every new addition to the social heritage is suggested in public, discussed and codified, or rejected in public under the influence of the "influentials" acting as elected officers. At the same time, the specialist circles keep up popular contacts all around them. They appeal to a wider range of lay connoisseurs or specially interested members of the general public and through these they recommend themselves to the common men throughout the entire community. Thus they establish the standing of their particular pursuits in the life of the community as a whole. The inner circle of creative men becomes entrusted by the whole of Society with the cultivation of certain ideals, in which the rest of the

[7] The moral philosophical aspects of the critique of planning in science will be dealt with in a review of the forthcoming publication of Prof. Polanyi's Riddell lectures, entitled *Science, Faith, Society.*

people take part at various stages of interest. We have here a system of indirect representation at each stage of which people less experienced and interested in a particular field confide in others more intimately connected with it." (ibid. p. 442)

Among these various dynamic orders within a given society, the State and the moral consensus serve as supervisors and coordinators but they must not intrude into the inner workings of each dynamic order, as long as it operates in accordance with these principles. Frictions are to be smoothed out and dynamic orders which are especially beneficial to the society are to be facilitated but *executive* coordination, the attempt to fit all activities of the society into a single corporate structure will destroy the dynamic orders by destroying the spontaneity of interest which makes them fruitful. Polanyi would agree that these dynamic orders may sometimes take on within themselves corporate structures to facilitate the achievement of individual ends and insofar as they restrict themselves to this facilitating function (e.g. Secretariats of learned societies, administration within a University) they are proper. Thus the grant of funds from the State to University research is permissible and indeed desirable *as long as it effects only the total quantity but not the direction of research.* Even the allocation of funds among various fields is acceptable if the grants are distributed in accordance with the principle of the maximization of scientific returns—which no one except scientists can estimate and even they can not do it with certainty. (Polanyi, *The Planning of Science*, Occasional Pamphlet No. 4. p. 10).

Not only must the allocation of funds be ultimately determined by scientists in accordance with their estimates as to where it can be best spent from the point of view of increasing our systematic understanding of natural laws. They must also be given an environment which is conducive to concentration on systematic thought.

"Here is the reason," Polanyi replies to the detractors of the ivory tower, "for the academic seclusion of science. A system of thought can be advanced only in the midst of a community which is thoroughly imbued with its understanding, which is both responsive and critical, and passionately devoted to the subject. Scientific thought can flourish only in a scientific atmosphere . . . There is no more back breaking task than to uphold science in an environment which does not understand science and does not value it. Academic seclusion represents therefore an indispensable framework for a single-minded application to systematic science." (ibid. p. 8).

This type of liberty which he calls "public liberty" since it serves to achieve certain desirable public goods, is distinguished from "private freedom" which is not a functioning element in a dynamic order. Private freedom is simply the freedom to do what one wishes with one's leisure time. Prof. Polanyi defends this type of freedom not only because he values highly the autonomy of every individual even in the performance of actions of negligible importance, but more significantly because of its connection with responsible public liberty. "We must not," he says, "think of the two as enemies. On the contrary, they merge into one another and mutually stimulate one another . . . privacy is the ground on which—amidst many purely personal matters—there germinate new ideas, which will eventually benefit the community. Irresponsible privacy, solitary habits, nonconformity and eccentricity are protected by liberal society because it sees in these the breeding ground of independent men: much needed for the public good" *(The Growth of Thought . . . p. 440).*

What began fifteen years ago as a major attack on the freedom of science in the English speaking world has led by counteraction to an increasingly systematic analysis of the nature and conditions of freedom in science such as the present century has not yet seen. It recalls in its clarity of mind and in its moral fervor, John Stuart Mill and though lacking the grandeur of that great spokesman for human freedom, it has the compensating merit—for scientists—of coming from scientists who know what freedom in the laboratory really means.

Personnel of US Atomic Energy Organization

(Continued from Page 79)

General Advisory Committee

J. Robert Oppenheimer, Chairman, Prof. of Physics, University of California, former Director of the Los Alamos Laboratory.

James B. Conant, President, Harvard University, Chairman, National Defense Research Committee.

Lee A. DuBridge, President, California Institute of Technology and former Director of the Radiation Laboratory, OSRD at M. I. T.

Enrico Fermi, Professor of Physics, University of Chicago.

I. I. Rabi, Professor of Physics, Columbia University.

Hartley Rowe, Vice-president and Chief Engineer, United Fruit Co.

Glenn T. Seaborg, Professor of Chemistry, University of California.

Cyril Stanley Smith, Director, Institute of Metals, University of Chicago.

Hood Worthington, chemical engineer for E. I. DuPont de Nemours & Co.

Joint House and Senate Committee on Atomic Energy

Senate:	Bourke Hickenlooper	(R., Iowa) chairman
	Arthur Vandenberg	(R., Mich.)
	Eugene D. Millikin	(R., Col.)
	Wm. F. Knowland	(R., Calif.)
	John Bricker	(R., Ohio)
	Brien McMahon	(D., Conn.)
	Richard B. Russell	(D., Georgia)
	Edwin Johnson	(D., Col.)
	Tom Connally	(D. Tex.)
House:	W. Sterling Cole	(R., N.Y.) vice-chairman
	Charles H. Elston	(R., Ohio)
	Carl Hinshaw	(R., Calif.)
	J. E. VanZandt	(R., Pa.)
	J. T. Patterson	(R., Conn.)
	Robert Thomason	(D., Texas)
	Carl T. Durham	(D., N.C.)
	Chet Hollifield	(D., Calif.)
	Charles M. Price	(D., Ill.)

Military Liaison Committee

Lt. Gen. Lewis H. Brereton, Wartime Far East Commander, 9th and 10th Airforce.

Rear Adm. Thorvald A. Solberg, Head of U. S. Navy Dep't of Research and Standards, and Navy Representative at Bikini tests.

Maj. Gen. Leslie R. Groves, Wartime Commanding Officer, Manhattan District.

Col. John H. Hinds, Artillery Commander, 2nd Infantry Div.

Rear Adm. R. A. Ofstie, Aviation Officer on Staff of Admiral Nimitz.

Rear Adm. William S. Parsons, associated with Los Alamos Laboratories during the war and present on flight which bombed Hiroshima.

How Far Have We Gone Towards International Control of Atomic Energy?

♦ **An estimate of the chances for eventual agreement on a program for international control. . . .**

by R. Gordon Arneson

[*Speech delivered by a member of the United States Delegation to the United Nations Atomic Energy Commission, before the Joint Institute of the National Committee on Atomic Information and the American Association for the United Nations, New York, February 25, 1947.*]

The question of "How far have we gone towards international control of atomic energy?" can be answered with realism only in terms of whether the Soviet Union will eventually come along with us and the nine other nations who have agreed to the basic principles of the United States proposals. What does the record to date show? Let us first see how the negotiations have proceeded thus far and then attempt to evaluate the chances of ultimate success.

Mr. Baruch was named the U. S. Representative to the United Nations Atomic Energy Commission early in April of 1946. From that time until the presentation of the United States position at the opening session of the Atomic Energy Commission, Mr. Baruch and his Associates held numerous conferences with the President, the Secretary of State, members of the Acheson-Lilienthal group and with members of Congress. The proposals of June 14 contain all of the important elements of the Acheson-Lilienthal Report plus certain other principles on which that report did not make any recommendations. The most important of these are the provisions that there should be no veto in atomic energy matters and that swift and certain punishments should be provided for specifically defined violations which are to be stigmatized as international crimes.

Atomic Development Authority

Very briefly, the United States plan calls for a special treaty establishing an international Atomic Development Authority responsible for control (including, where necessary, accounting, inspection, supervision, management, and licensing) of all activities in the field of atomic energy. The Authority is to be supported by a system of rapid and effective punishments for violations and by free access for geological surveyors and other necessary inspectors to prevent misuse and to ensure compliance. No single state should have power to block the carrying out of specific punishments for crimes specifically defined in advance by voluntary agreement in the treaty. After a system of international control is brought into effective operation by appropriate stages, carefully spelled out in the treaty, we propose to cease bomb production and dispose of any existing bombs in accordance with the terms of the treaty, properly ratified in accordance with our established constitutional processes.

The first phase of the negotiations extended from June 14 through June 25. While all twelve nations made opening statements in the Commission, specific plans were put forward only by the United States and the USSR. The Soviets proposed a convention calling for the immediate outlawing of the production and use of atomic weapons and the destruction of all stocks of atomic weapons within a period of three months thereafter and the enactment of *national* enforcement legislation within six months. Mr. Gromyko suggested that once this was done the Commission might give consideration to means of exchanging information and to possible methods of control.

In the second phase—June 25 through July 15—the United States presented a series of three memoranda which elaborated provisions that might be contained in the treaty and the charter establishing the Authority, its detailed powers and functions, and the relations between the Authority and the organs of the United Nations.

It was proposed that the international control body should have a degree of autonomy commensurate with its responsibilities but to the extent possible this body should be brought into close relationship with the existing United Nations structure. As to veto and punishments, it was urged that a formula should be found which would not diminish the general powers of the Security Council relating to the maintenance of international peace and security but which would not subject the Authority to inaction through the use of the veto. The treaty should define specifically certain acts as international crimes and should provide for swift and certain punishment of violators.

Adequate protection against the dangers of atomic warfare requires international machinery which can and will act quickly—machinery which will not permit an offender to be protected by his own or another's obstruction. These memoranda held that general international peace and security problems for which the Security Council has primary responsibility under the charter should require unanimity of action as far as the Big Five were concerned since the situations that might arise were not, by their very nature, forseeable in advance and therefore not susceptible of advance unanimous agreement as to the action to be taken.

Protection Against Violations

In this field of atomic energy, however, the dangers are so terrible and so obvious that all nations should be able to agree to commit themselves in advance to take necessary action to put down a violator before atomic warfare could engulf the world. The United States suggested that the term "armed attack" in Article 51 of the Charter might be redefined in a manner appropriate to the atomic age—re-defined so as to include not only the actual dropping of an atomic bomb, but also certain other steps which in themselves would necessarily be preliminary to such action. These would include, for example, seizure of any facility of the ADA, any willful interference with the operations of the ADA, and so forth.

The third phase of discussion from July 24 through August 6 was an elaboration of the Soviet proposals of June 19. It developed that the Soviet proposals were

based on the principle of *national* control of atomic energy activities in the various countries, coupled with a convention to outlaw the production and use of atomic weapons. The Soviets proposed that the Security Council should handle any cases arising in this field which might constitute a threat to international peace and security in the same way that other threats would normally be handled by that body. No provision was made for inspection nor for any international machinery of control and enforcement beyond action by the Security Council under the terms of the Charter. It was at this time that Mr. Gromyko stated that the United States proposals were not acceptable "as a whole or in their separate parts."

After the basic ideas of the Soviet position had been elaborated, most of the other delegates expressed doubt that the Soviet proposals could be effective. They emphasized particularly that there was urgent need for a system of control which, on the one hand, would foster the beneficial uses of atomic energy, while, on the other, they would prevent its diversion to destructive ends. They saw clearly that a system which provided only for punishments after bombs were dropped would not be enough and that emphasis should be put on a fully effective system which would prevent diversion. They saw too that national legislation defining certain acts as crimes would be of doubtful value since the danger of the use of atomic weapons would come not from individuals but from governments.

Scientific and Technical Committee

When it became clear that the United States and Soviet proposals were seriously at odds with each other, the Atomic Energy Commission decided to establish a Scientific and Technical Committee to study the scientific and technical aspects of the problem of control. During this fourth phase other discussions were suspended while the Scientific and Technical Committee proceeded with its study. In its report which came out of a series of some twenty-odd informal meetings, the Scientific and Technical Committee concluded that, on the basis of the available scientific facts, there was no reason for supposing that effective control was not technologically feasible. The Committee carefully avoided any attempt to evaluate the political feasibility of any system or systems by which effective control could be achieved. The report found that the same atomic energy activities might lead either to peaceful or destructive uses and that these peaceful and destructive possibilities were so closely inter-linked as to be almost inseparable. It analyzed the principal activities involved in the peaceful use of atomic energy and described the points of danger and the character of the dangers which would exist at each point unless appropriate safeguards were established against the use of atomic energy for destructive ends.

The next phase of negotiations which began on October 2 was concerned with the examination of the types of safeguards that should be established in order to meet the facts presented by the Scientific and Technical Sub-Committee report. The Sub-Committee on Controls organized its study around these three major problems:

1. measures to prevent diversion of uranium and thorium and their fissionable derivatives to destructive ends;
2. measures to prevent clandestine operations; and
3. measures to prevent seizure of plants and facilities.

The Committee held more than a score of informal meetings in which various technical experts participated. The Soviet representative on the Committee, Professor Alexandrov, participated fully in the discussions and, indeed, made several helpful contributions. When the report of the Committee was completed on December 26, however, both the USSR and Poland did not vote for it. Poland abstained, while the USSR asked to be recorded as not having participated in the adoption of the report.

Report on Safeguards

The Committee's report on safeguards was incorporated as Part V of the First Report of the Atomic Energy Commission to the Security Council on December 31. The most important conclusion reached by this study was that an international control agency must be responsible for the system of safeguards and control. While indicating the types of safeguards that should be applied at various stages by the international control agency, the Committee was careful to point out that its findings were not definitive but rather indicative of the types of safeguards required. In other words, the findings do not represent a comprehensive plan for atomic energy control but only some of the elements which should be incorporated in any complete and effective system.

The sixth phase of the negotiations might be called: "Adoption of the basic principles of the U.S. proposals". As the Committee on Controls proceeded with its work, on November 13 the Atomic Energy Commission decided to submit to the Security Council by December 31, a Year-End Report of its proceedings, findings, and recommendations to date.

Avoided Political Problems

Both the Scientific and Technical Subcommittee and the Sub-committee on controls, while making important contributions to the work of the Atomic Energy Commission, had avoided coming to grips with the political problems that had to be faced. Indeed, at various stages in the negotiations the Soviet representative had insisted that political considerations could not properly be handled by any of the sub-committees but would have to be considered by the Atomic Energy Commission itself. Accordingly, on December 5th the United States Representative put forward for consideration by the Commission and for action at a later meeting a series of general findings and recommendations to be incorporated into the report to the Security Council. Meanwhile, the General Assembly had begun consideration of the general problem of disarmament. In the debates that were held on this matter, statements made by Soviet representatives, particularly Mr. Molotov, gave some reason to hope that a greater measure of agreement on atomic energy control than had appeared likely earlier might now be possible.

On December 17, the Atomic Energy Commission voted to accept the principles on which the United States general findings and recommendations were based, with the proviso that the wording should be conformed to the pertinent wording of the General Assembly Disarmament Resolution of December 14, 1946.

The sixth phase of the Commission's work ended on December 30th when, by

a vote of 10 to 0, with the USSR and Poland abstaining, the Commission approved a report to the Security Council. It included, in slightly amended form, the general findings and recommendations proposed by the United States Representative, which constitute the basic principles of the proposals that were first put forward by Mr. Baruch on June 14 and consistently advocated by him during the negotiations.

The seventh phase of negotiations is taking place in the Security Council, rather than the Atomic Energy Commission. The question of atomic energy control has become entangled with the question of general disarmament. As you know, the Security Council finally decided to set up such a Commission on Conventional Armaments but enjoined that body from encroaching on the area of work already assigned to the Atomic Energy Commission—this including not only atomic weapons, but all other weapons adaptable, now or in the future, to mass destruction. The Security Council also agreed to begin consideration of the Atomic Energy Commission report as soon as possible. This began on February 14.

Gromyko Amendments

Last Tuesday, February 18, Mr. Gromyko put forward a series of amendments to the general findings and recommendations of the Year-End Report of the Atomic Energy Commission. Some of the amendments are minor. We need concern ourselves here with the four major ones. They deal with the questions of (1) prohibiting the production and use of atomic bombs, (2) inspection, (3) punishment of violations and (4) positive developmental functions.

As to the first, the report of the Atomic Energy Commission recommends a gradual transition from national to full international control over a period of time on a step by step basis. These steps are to be specifically spelled out in the treaty. The transition would not be completed until a single unified international system of control and inspection including effective safeguards had been established. The report rejected as futile the Soviet proposal for a convention simply outlawing the use of atomic weapons. In other words, while the treaty would prohibit atomic weapons, this prohibition would be linked to the effective establishment of an adequate system of control including inspection and enforcement provisions. Mr. Gromyko's amendments call for, as a prerequisite to effective international control, a convention prohibiting atomic weapons. Further, by calling for the turning over to international management of existing plants immediately after a control convention has been signed, the Soviet amendment would require the United States to give up the Oak Ridge and Hanford plants before international safeguards have been put into operation.

As to inspection, the report would give the international control agency broad powers of access and inspection which would not be subject to any nation's obstruction by veto or otherwise. This is the principle of "no-veto on day to day operations." Mr. Gromyko's amendments would modify this provision by striking out the reference to veto-less inspection and substituting the following: "The control organs and the organs of inspection should carry out their control and inspection functions, acting on the basis of their own rules, which should provide for the adoption of decisions, in appropriate cases, by a majority 'vote'." What "in appropriate cases" means is not clear. In any event it clearly does not mean "in *all* cases." Further this amendment contains no prohibition against national obstruction of the international agency's functions.

On the question of the veto on punishments for serious violations, the report declares that no nation shall have the legal right by veto or otherwise whereby a willful violator shall be protected from the consequences of violations. The Soviet view is that enforcement must remain under the Security Council with the veto intact.

Positive ADA Functions

The Atomic Energy Commission report places considerable emphasis on the need for giving the international control agency positive research and developmental functions in order that it can remain in the forefront of atomic knowledge and be prepared to meet any new developments in the field. By proposing to omit several paragraphs of the recommendations dealing with this important point, the Soviets apparently seek to place primary emphasis on negative control and police functions. In the view of the United States such emphasis would seriously jeopardize the effectiveness of international control.

What answer then can we give to the question: How far have we gone towards international control of atomic energy?

The Atomic Energy Commission, in more than eight months of negotiations, has arrived at a preponderant conviction that a system of control similar to the one advocated by the United States is essential. This conviction has grown out of long and laborious discussions, both formal and informal, which have dealt with not only the technical and scientific facts of the problem, but with the political aspects as well. The United States proposals have the support of nine other nations. Unfortunately, this support is not unanimous. The Soviets and the Poles have not joined the other members of the Commission in approving the basic principles of the United States plan. In agreeing to the report of the Scientific and Technical Sub-Committee, the Soviets gave themselves an out in stating that the conclusions of the report were based on incomplete information, and were, therefore, hypothetical. They participated actively in the study of safeguards carried on by the Sub-Committee on Controls, but when it came time to vote on the Sub-Committee's report, the USSR asked to be recorded as not having participated in its adoption. The Soviet Union abstained from voting on the Year-End Report of the Atomic Energy Commission to the Security Council. The amendments now proposed by the Soviets raise the question as to whether the Soviet position on atomic energy control has changed materially since the 19th of June 1946. A clarification of the intent of these amendments is the immediate task before the Security Council.

The United States plan for atomic energy control as embodied in the Atomic Energy Commission report is sound, generous, and just. It merits our full support. The United States has held to its position patiently but firmly. It will continue to do so. Compromises on basic principles cannot and, I am sure, will not be made. The issues at stake are too great to permit of compromise in the name of palatability. We can only hope that the logic of the facts will eventually prevail.

Disarmament and Atomic Energy in the Security Council

♦ Summary of the Security Council's deliberations on atomic energy and of Gromyko's March 5 speech.

Commission for Conventional Armaments Established

IN THE LAST ISSUE, we reported the procedural wrangle between the US and the USSR in the Security Council over the priority to be assigned to the consideration of the disarmament resolution of the General Assembly and of the report of the Atomic Energy Commission.

The wrangle was renewed on February 4, with the US submitting a draft resolution which proposed that the Security Council establish a Disarmament Commission, as desired by the USSR, but specified that the terms of reference of this Commission should exclude matters which fall within the competence of the Atomic Energy Commission.

This American resolution was opposed by the USSR and Australia as delaying unnecessarily the implementation of the general disarmament resolution. The USSR delegate was in favor of proceeding immediately with the creation of a General Disarmament Commission and implied that this commission should have the right to consider all phases of disarmament, including atomic weapons. Australia, and several other countries, were in favor of parallel advance in both fields—creation of a Disarmament Commission and immediate consideration of the atomic energy report.

The five nations which submitted resolutions—US, USSR, Australia, France and Columbia — were constituted a subcommittee to attempt a unification of proposals. The Security Council debate on their draft centered around the extent of jurisdiction to be given to the proposed Disarmament Commission.

Mr. Austin argued that a re-statement of the exclusive jurisdiction of the Atomic Energy Commission was needed, since some of Mr. Gromyko's earlier statements indicated that, without such explicit instruction, the new Commission might feel within its rights, for example, "in recommending to the Security Council to request information on armaments including atomic weapons."

(Mr. Austin apparently wanted to prevent a situation in which the U.S. may be asked, by a majority vote in the Disarmament Commission, to reveal the number and efficiency of the atomic bombs in its possession. The Atomic Energy Commission is not likely to do so, because its terms of reference do not include a "census of armaments.")

Mr. Gromyko contended that first, the re-statement of the competence of the Atomic Energy Commission is trivial, since it was included in the disarmament resolution of the General Assembly, and second, that the latter resolution in no way precludes the consideration of atomic weapons in the frame of general disarmament.

On *February 13*, the resolution as a whole was put to a vote. Only the USSR abstained and even Poland voted with the other nine members. The resolution recognized, on behalf of the Security Council, the principle that reduction of armaments is necessary to peace, and agreed to the following measures:

1 To put into effect the resolutions of the General Assembly on 14 December, 1946, concerning the international control of the reduction of armaments and armed forces, and information dealing with the armed forces of the United Nations.

2 To consider as soon as possible the report of the Atomic Energy Commission.

3 To set up a commission of representatives of the Security Council to prepare within three months a report on proposals for the reduction of armaments, and safeguards in connection with such reduction in order to ensure the implementation of the above mentioned resolutions of the General Assembly. The new commission is to be entitled the Commission for Conventional Armaments.

4 To ask the Military Staff Committee to submit immediately recommendations requested on 15 February, 1946 and to submit not later than 30 April, 1947, their conception of the basic principles which should govern the United Nations Armed forces.

Atomic Energy Control

With the Commission for Conventional Armaments established, the Security Council took up at once the consideration of the first report of the Atomic Energy Commission.*

On *February 14*—an important date little noted by the press—the USSR for the first time presented definite views on the international plan for the control of atomic energy.

Mr. Gromyko outlined the position of the USSR in a speech on February 14 and submitted specific amendments to the report of the Atomic Energy Commission on February 18. The first part of Mr. Gromyko's speech was rather disappointing since it began with the same old attacks on the American plan as intending to perpetuate the American monopoly in atomic armaments, and continued with the same old appeals for immediate outlawing of atomic bombs and destruction of existing stocks.

In the second part of the speech, Mr. Gromyko dealt with the Soviet objections to the American plan, as embodied in the report of the Atomic Energy Commission. He insisted that the control agency be established "within the framework of the Security Council," that no breach of the "unanimity rule" in the Security Council be contemplated.

The encouraging points of the speech came at the end. They were three: (1) that reliable procedures for punishment of violators must be established, although these procedures should not require changes in the Charter, such as abolition of the veto; (2) that the rights of control and inspection must be granted and the inspection bodies, once established, given the possibilities of autonomous operation; and (3) that "in spite of serious defects of the report, the USSR is prepared to consider it item by item and submit amendments."

* For complete text of this report, exclusive of Part IV, see BULLETIN, Vol. 3, No. 1 (January 1947). Part IV was reprinted earlier, in Vol. 2, Nos. 7-8 (October 1946).

Soviet Amendments

The Soviet amendments to the Report of the Atomic Energy Commission were submitted by Mr. Gromyko on February 18. Three amendments were to the section "General Findings" in Part II, and nine to Part III ("Recommendations"). Mr. Gromyko suggested that the rest of the report (such as the analysis of technical feasibility, and of the objects and types of inspection) be considered merely as material submitted to the Security Council for information. If the Council decided to examine these parts as well, he said he would have to submit additional amendments.

Following is the text of Part II, Section C, and Part III of the report, as it will appear after the incorporation of the Soviet amendments.

(Additions are italicized; deletions are indicated by brackets. Based on Security Council document S/283.)

Part II—C. General Findings

The findings of the "First Report on Scientific and Technical Aspects of the Problem of Control" and of the "First Report on Safeguards Required to Ensure the Use of Atomic Energy Only for Peaceful Purposes," while limited to the more technical aspects of the control of atomic energy, provide a basis for further progress by the Commission toward the fulfillment of the terms of reference set out in the General Assembly Resolution of 24 January 1946, establishing a commission to deal with the problems raised by the discovery of atomic energy and other related matters. The Resolution of 14 December 1946 of the General Assembly, entitled "Principles Governing the General Regulation and Reduction of Armaments," provides certain broad and essential political agreements. Based upon the proposals and information presented to the Commission, upon the hearings, proceedings, and deliberations of the Commission to date, and upon the proceedings, discussions, and reports of its several committees and sub-committees, all as set forth in this report, the Commission has made the following additional findings of a general nature:

1 That scientifically, technologically, and practically, it is feasible,

(a) to extend among "all nations the exchange of basic scientific information" on atomic energy "for peaceful ends,"*

(b) to control "atomic energy to the extent necessary to ensure its use only for peaceful purposes,"*

(c) to accomplish "the elimination from national armaments of atomic weapons,"* and

(d) to provide "effective safeguards by way of inspection and other means to protect complying states against the hazards of violations and evasions."*

2 That effective control of atomic energy depends upon effective control of the production and use of uranium, thorium, and their fissionable derivatives. Appropriate mechanisms of control to prevent their unauthorized diversion or clandestine production and use and to reduce the dangers of seizure—including one or more of the following types of safeguards: accounting, inspection, supervision, management, and licensing—must be applied through the various stages of the processes from the time the uranium and thorium ores are severed from the ground to the time they become nuclear fuel and are used. (Cf. "Findings on the Safeguards to Ensure the Use of Atomic Energy Only for Peaceful Purposes," PART II B of this report.) Ownership by the international control agency of mines and of ores still in the ground is not to be regarded as mandatory.

Inspection, supervision and management on the part of an international organ shall be applied in regard to all existing plants for the production of ultimate atomic materials (nuclear fuel) immediately after the entry into force of an appropriate convention or conventions.

3 That whether the ultimate nuclear fuel be destined for peaceful or destructive uses, the productive processes are identical and inseparable up to a very advanced state of manufacture. Thus, the control of atomic energy to ensure its use for peaceful purposes, the elimination of atomic weapons from national armaments, and the provision of effective safeguards to protect complying States against the hazards of violations and evasions must be accomplished through a single unified international system of control and inspection designed to carry out all of these related purposes.

4 That the development and use of atomic energy are not essentially matters of domestic concern of the individual nations, but rather have predominantly international implications and repercussions.

5 That an effective system *of* [for the] control of atomic energy must be international *in scope* and must be established by an enforceable multilateral [treaty or] convention which [in turn] must be administered [and operated by an international organ or agency] within the *framework of the Security Council* [United Nations, possessing adequate powers and properly organized, staffed, and equipped for the purpose].

Only by such an international system of control and inspection can the development and use of atomic energy be freed from nationalistic rivalries with consequent risks to the safety of all peoples. Only by such a system can the benefits of widespread exchange of scientific knowledge and of the peaceful uses of atomic energy be assured. Only such a system of control and inspection would merit and enjoy the confidence of the people of all nations.

6 That *an* international *convention outlawing* [agreement to outlaw] the [national] production, possession, and use of atomic weapons is an essential part of any such [international] system of *international* control [and inspection] *of atomic energy*. [An international treaty or convention to this effect, if standing alone, would fail

(a) "to ensure" the use of atomic energy "only for peaceful purposes,"* and

(b) to provide "for effective safeguards by way of inspection and other means to protect complying States against the hazards of violations and evasions,"*

and thus would fail to meet the requirements of the terms of reference of the Commission.] To be effective, such a *convention must provide for the establishment of* [agreement must be embodied in

* Commission's terms of reference, Article V, Resolution of the General Assembly, 24 January 1946.

a treaty or convention providing for] a comprehensive [international] system of *international* control *including supervision and inspection to ensure the carrying out* [and inspection and including guarantees and safeguards adequate to ensure the carrying out] of the terms of the [treaty or] convention and "to protect complying States against the hazards of violations and evasions."*

Part III. Recommendations

Based upon the findings of the Commission set forth in Part II of this report, the Commission makes the following recommendations to the Security Council with respect to certain of the matters covered by the terms of reference of the Commission, which recommendations are interdependent and not severable, embodying the fundamental principles and indicating the basic organizational mechanisms necessary to attain the objectives set forth in Part II C, General Findings, paragraph 1 (a)-(d) above.

1 There should be a strong and comprehensive international system of control and inspection aimed at attaining the objectives set forth in the Commission's terms of reference *and in the General Assembly resolution of 14 December 1946 on "Principles Governing the General Regulation and Reduction of Armaments."*

2 Such *a* [an international] system of *international* control [and inspection] *of atomic energy* should be established and its scope and functions defined by a [treaty or] convention in which all of the nations Members of the United Nations should be entitled to participate *with the same rights and obligations* [on fair and equitable terms].

The international system of control [and inspection] should *be declared* [become] operative only when those Members of the United Nations necessary to assure its success by signing and ratifying the [treaty or] convention have bound themselves to accept and support it.

Consideration should be given to the matter of participation *of* [by] non-Members of the United Nations.

3 The [treaty or] convention should include, among others, provisions (a) Establishing *within the framework of the Security Council* [in the United Nations] an international control *Commission* [agency] possessing powers and charged with responsibility necessary [and appropriate] for the [prompt and] effective *implementation of* [discharge of the duties imposed upon it by] the terms of the [treaty or] convention *and for the prompt discharge of its day-to-day duties.* Its rights, powers, and responsibilities [as well as its relations to the several organs of the United Nations] should be clearly established and defined by the [treaty or] convention. Such powers should be sufficiently broad and flexible to enable the *Commission* [international control agency] to deal with *the situation* [new developments] that may [hereafter] arise in the field of atomic energy *in connection with new discoveries.* [The treaty shall provide that the rule of unanimity of the permanent Members, which in certain circumstances exists in the Security Council, shall have no relation to the work of the international control agency. No government shall possess any right of veto over the fulfillment by the international control agency of the obligations imposed upon it by the treaty nor shall any government have the power, through the exercise of a right of veto or otherwise, to obstruct the course of control or inspection.] In particular, the Commission *shall assist in every way in promoting* [The international control agency shall promote] among all nations the exchange of basic scientific information on *the use of* atomic energy for peaceful *purposes,* [ends, and] shall be responsible for preventing the use of atomic energy for *military* [destructive] purposes, and for *stimulating its uses for the benefit of the peoples of all countries* [the control of atomic energy to the extent necessary to ensure its use only for peaceful purposes]. *The control organs and the organs of inspection should carry out their control and inspection functions, acting on the basis of their own rules, which should provide for the adoption of decisions, in appropriate cases, by a majority "vote."*

[The international control agency should have positive research and developmental responsibilities in order to remain in the forefront of atomic knowledge so as to render the international control agency more effective in promoting the beneficial uses of atomic energy and in eliminating its destructive ones. The exclusive right to carry on atomic research for destructive purposes should be vested in the international control agency.]

[Research in nuclear physics having a direct bearing on the use of atomic energy should be subject to appropriate safeguards established by the international control agency in accordance with the treaty or convention. Such safeguards should not interfere with the prosecution of pure scientific research, or the publication of its results, provided no dangerous use or purpose is involved.]

[Decisions of the international control agency pursuant to the powers conferred upon it by the treaty or convention should govern the operations of national agencies for atomic energy. In carrying out its prescribed functions, however, the international control agency should interfere as little as necessary with the operations of national agencies for atomic energy, or with the economic plans and the private, corporate, and State relationships in the several countries.]

(b) Affording the duly accredited representatives of the international control agency unimpeded rights of ingress, egress, and access for the performance of their inspections and other duties into, from and within the territory of every participating nation, unhindered by national or local authorities.

(c) Prohibiting the manufacture, possession, and use of atomic weapons by all nations parties *to the convention or conventions* [thereto] and by all of their *nationals* [persons under their jurisdiction].

(d) Providing for *the destruction of* [the disposal of any existing] stocks of *manufactured* atomic weapons and *of unfinished atomic weapons* [for the proper use of nuclear fuel adaptable for use in weapons].

(e) Specifying the means and methods of determining violations of *the* [its] terms *of the convention, condemning such violations as* [setting forth such violations as shall constitute] international crimes, and establishing the nature of the measures of enforcement and punishment to be imposed upon persons and upon nations guilty of violating *its provisions* [the terms of the treaty or convention].

The judicial or other processes for deter-

* Commission's terms of reference, Article V, Resolution of the General Assembly, 24 January 1946.

mination of violations of the [treaty or] convention, and of punishment[s] therefor, should be swift and certain. Serious violations of the *convention* [treaty] shall be reported immediately by the *Commission* [international control agency] to the nations parties to the *Convention* [treaty], [to the General Assembly] and to the Security Council. [Once the violations constituting international crimes have been defined and the measures of enforcement and punishment therefor agreed to in the treaty or convention, there shall be no legal right, by veto or otherwise, whereby a willful violator of the terms of the treaty or convention shall be protected from the consequences of violation of its terms.] [The enforcement and punishment provisions of the treaty or convention would be ineffectual if, in any such situations, they could be rendered nugatory by the veto of a State which had voluntarily signed the treaty.]

4 In consideration of the problem of violation of the terms of the [treaty or] convention, it should [also] be borne in mind that a violation might be of so grave a character as to give rise to the inherent right of self-defense recognized in Article 51 of the Charter of the United Nations.

5 The [treaty or] convention should embrace the entire programme of putting the [international] system of *international* control [and inspection] *of atomic energy* into effect and should provide a schedule for the completion of the transitional process, *after the expiration of a certain period of time* [over a period of time], step by step, in an orderly and agreed sequence leading to the full and effective establishment of international control of atomic energy. In order that the transition may be accomplished as rapidly as possible and with safety and equity to all, this Commission should supervise the transitional process, as prescribed in the [treaty or] convention, and should be empowered to determine when a particular stage or stages *may be considered to* have been completed and subsequent ones are to commence.

6 ***With a view to the earliest implementation of the findings and recommendations stated above, and also of the General Assembly Resolution of 14 December 1946 on "Principles Governing the General Regulation and Reduction of Armaments," the Security Council recognizes the urgency of considering draft conventions on the prohibition of atomic and other major weapons adaptable to mass destruction.***

* * *

A critical analysis of the Soviet amendments can be found in the editorial in this issue, and in a speech by R. Gordon Arneson reprinted on page 83.

* * *

Back to the Atomic Energy Commission?

On *February 20*, further discussion of the report and the Soviet amendments took place.

Both English and French representatives contended that most of the differences between the Soviet proposals and the Commission's recommendations were of "secondary" importance. Sir Alexander Cadogan said that only three items represented fundamental differences of view—

1 that atomic weapons be destroyed before international control was established,

2 that research and development functions of the proposed international agency be eliminated, and

3 that no abolition of the punishment veto be required.

On the other hand, the British representative argued that the Soviet amendments should make it possible to attain unanimous agreement in the Security Council on what he described as perhaps the chief conclusions of the Commission:

"Firstly, that it is technologically feasible to control atomic energy to the extent necessary to insure its use only for peaceful purposes.

"Secondly, that the control, to be effective, must be international and must be vested in a single international agency.

"And thirdly, that the system of international control and therewith the prohibition of the use of atomic energy for destructive ends, should be established by an enforceable multilateral treaty or convention which will confer upon the agency all powers necessary for the prompt and effective discharge of the duties imposed upon it."

On *February 26*, the U.S. representative introduced a resolution acknowledging receipt of the Atomic Energy Commission's report, and asking for the eventual submission of a draft treaty or convention incorporating its ultimate proposals.

Gromyko's Speech

On *March 5*, Mr. Gromyko delivered in English, before the Security Council, a carefully prepared speech embodying the Soviet reaction to the Atomic Energy Commission's report. The Council's meetings had been postponed from the previous week because of a delay in the receipt of instructions from Moscow. Excerpts from Mr. Gromyko's speech follow:

The discussion of the report of the Atomic Energy Commission in the Security Council was useful in the respect that the attitude of individual states became still clearer toward the questions on which there is no difference of opinion as well as toward the questions on which the agreement has still not been reached.

At the same time it is necessary to point out that no noticeable progress has yet been made in reaching an agreement on a number of important questions of atomic energy control. The proposals submitted on these questions by the Soviet delegation so far have not been subjected to a due consideration.

In speaking about the important questions and proposals, I have in mind, first of all, the question of the conclusion of a convention for the prohibition of atomic and other major weapons of mass destruction, and the Soviet proposal on this subject.

Charges Deliberate Delays

We are still being told that atomic weapons cannot be prohibited until the Soviet Union accepts the American proposals on the question of the control of atomic energy. Such a posing of the question, at the basis of which lies a desire to dictate to other member-states of the United Nations the terms which one country is trying to impose with the purpose of strengthening its monopoly position in the field of atomic energy, cannot conform with the interests of an urgent and successful solution of the problems on the establishment of atomic energy control.

The United States representatives decisively object to the conclusion of a convention on the prohibition of atomic weapons, though it is not difficult to understand that the urgent conclusion of this very convention is imperatively dictated by the whole situation. It is dictated by the nature of the atomic weapon itself as a weapon of aggression. It is dictated by the fact that at the present time atomic energy is still being used only for military purposes.

It is dictated by the fact that there are no objectively existing obstacles, especially in the light of the available historical examples of the prohibition of poisonous and suffocating gases, analogous liquids and bacteriological means of warfare.

The only obstacle for the conclusion of such a convention is the desire of one country to impose its will in questions of atomic energy on other countries, regardless of their legitimate interests.

Would Prohibit Bomb First

The necessity of an urgent solution of the problem of the prohibition of atomic weapons which are the weapons of aggression and constitute a threat, first of all, to the civilian population, is also dictated by the ancient traditions of mankind, proving to us that even at early stages of the development of civilization, certain moral norms had been already formed according to which it was considered a crime to exterminate a peaceful population in war. For centuries the following saying, "May the blood of women, children and old men not stain your victory," was popular among many peoples. Not a few instructive examples can be found in the history of the Middle Ages.

Let us hope that our organization of the United Nations created in the twentieth century will successfully compete in this respect with the morals of the ancients and the Middle Ages.

The conclusion of such a convention, besides the fact that it should represent a concrete and practical step toward the fulfillment of the General Assembly decision of Dec. 14, 1946, would create more favorable conditions for the solution of other questions following from the General Assembly resolution, to say nothing of the fact that the conclusion of such a convention would contribute to the strengthening of the mutual confidence among the member-states of the United Nations and to the strengthening of the authority of our organization.

Effective inspection is a necessary component part of the system of international control. I have considered it necessary to make this additional explanation, since the position of the Soviet Union on this question is often presented in the wrong light and sometimes even distorted outright.

Speaks of Industrial Interference

The position of the Soviet Union on the questions of the control of atomic energy and inspection is clear. Strict international control and inspection of atomic energy should be established. At the same time this strict international control and strict inspection should not develop into interference with those branches of industry which are not connected with the production of atomic energy. The international control of atomic energy should not deal with those questions which are not connected with atomic energy.

The transformation of atomic energy control into an unlimited control would mean to reduce to an absurdity the very idea of control of atomic energy in order to prevent its use for military purposes. Unlimited control would mean an unlimited interference of the control and controlling organ (or organs) in the economic life of the countries on whose territories this control will be carried out, and interference in their internal affairs. This is not required of us by the fulfillment of the tasks set forth by the United Nations in the field of atomic energy control and prohibition of atomic weapons.

Such a conception of the international control, as is presented to us in the proposals of the United States, and which lies at the basis of the appropriate sections of the report of the Atomic Energy Commission may only complicate the entire matter of organizing the control and inspection, since, as I have already pointed out, it would mean a crude interference of the control organ in the internal affairs of states, in their economic life, which cannot be compatible with the basic principles of the United Nations.

The United States proposals on control proceed from the erroneous premise that the interests of other States should be removed to the background during the exercise by the control organ of its control and inspectorial functions. Only by proceeding from such fundamentally vicious premises, was it possible to come to the conclusion contained in the proposals submitted to the Atomic Energy Commission by the United States representative on the necessity of transferring atomic enterprises to the possession of the international organ which is to be charged with responsibility for the realization of control.

Sees Trust Creation As Aim

The tasks of the control organ which is entrusted with ownership, licensing and with a number of other functions are, as it were, identified with the tasks of international syndicates and trusts, the role and influence of which upon international relations and upon the economics of individual countries are well known.

It was not for the creation of international syndicates and trusts, which would possess the establishment, located on the territory of individual countries, that the Atomic Energy Commission was established. It was not for this that the General Assembly decided on December 14, 1946, on the necessity of establishing atomic energy control and on prohibiting atomic weapons. It is time to understand that one cannot approach the solution of such questions, guided only by the interests of one country—it is necessary to take into consideration the legitimate interests of other countries as well.

One cannot imagine such a situation in which a control organ would possess establishments in different countries, decide the questions whether to allow or not to allow the creation of such establishments on the territories of these or other countries and would have the exclusive right to carry on scientific research in the field of the production and use of atomic energy.

It is impossible to imagine such a situation. Only people who have lost the sense of reality can seriously believe in the possibility of creating such arrangements.

It remains only to add to such a proposal the further suggestion that the international control organ should share profits of establishments under its management in accordance with the quantity of shares belonging to one or another country. Then the picture will be complete.

"Vicious and Unacceptable"

I draw the attention of the Security Council also to the fact that, according to the finding contained in the report, management is normally a prerogative of ownership. It is true that in the same part of the report it is stated that management "need not imply ownership." However, these reservations, which apparently have been inserted to soften the main thesis, do not change the meaning of this paragraph and of the idea expressed in it, which is thoroughly vicious and unacceptable.

I have already pointed out that the proposal on granting to an international control organ the right to possess establishments for the production of atomic energy and unlimited power to carry out other important functions connected with the ownership and management of the establishments and with the disposition of their production would lead to interference by the control organ in the internal affairs and internal life of states and eventually would lead to arbitrary action by the control organ in the solution of such problems as fall completely within the domestic jurisdiction of a state.

I deem it necessary to emphasize that granting broad rights and powers of such a kind to the control organ is incompatible with the state sovereignty. Therefore, such proposals are unacceptable and must be rejected as unfounded.

For Some Majority Decisions

The position of the Soviet Union on this question has already been stated more than once. If it is necessary, I am prepared to repeat that such an organ [of control] must have the right to take, in appropriate cases, decisions by majority vote.

Does this mean, however, that it is possible by using references to international control to agree in reality to granting the right of interference in the economic life of a country even through the decision of the majority in the control organ? The Soviet Union does not wish and cannot allow such a situation.

The Soviet Union is aware that there will be a majority in the control organs which may take one-sided decisions, a majority on whose benevolent attitude toward the Soviet Union the Soviet people cannot count. Therefore, the Soviet Union, and probably not only the Soviet Union, cannot allow that the fate of its national economy be handed over to this organ.

Bars Unlimited Inspection

Strict regulation of powers and duties of a control organ should exclude the unlimited access for inspection purposes to all equipment and operations, an access which is now provided for in the report of the Atomic Energy Commission, and should also exclude granting to inspection the right to shut down plants, to interfere with normal mining and milling operations and granting it the right of giving so-called licenses, that is, the permission to conduct definite activities on definite conditions, etc. Regulation of the activities of the control organs will exclude similar actions, which are described in such detail in the so-called first report on safeguards, contained in the report of the Atomic Energy Commission.

In reality to grant to the control organ unlimited rights and possession and management of the atomic establishments, cannot be looked upon as anything but an attempt by the United States to secure for itself world monopoly in the field of atomic energy. This tendency has found its expression in the proposals submitted by the representative of the United States on the Atomic Energy Commission, and later laid down as the basis of the report of the Atomic Energy Commission.

The adoption of such proposals, as well as the plan of the atomic energy control as a whole, submitted some time ago by the representative of the United States is in contradiction with the basic economic and national interests of other States, for this plan is directed against their economic independence. It is directed against the independence of other States. The situation is not altered by the fact that such a proposal even finds support.

Clings to So-called "Veto"

I have already had an opportunity to state the point of view of the Soviet delegation on the question of principle of unanimity of the five powers—permanent members of the Security Council, in connection with the discussion of the questions of the atomic energy control. The Soviet delegation considers that it will be impossible to reach an agreement on this question as long as the unacceptable proposal on the question of the so-called "Veto" is defended, since such a proposal is in contradiction with the principles of the United Nations.

I have also pointed out that there seems to be no difference of opinion among us on the question of the necessity of punishing violators, and there was not any on this subject. All agree that certain sanction measures should be applied against violators, if their guilt is proved. There is a divergence of opinions as to who and how should take decisions on sanctions. Should such decisions be taken in accordance with the basic principles of the United Nations or in violation of these principles?

The Soviet delegation considers that such decisions should be taken in strict conformity with the basic principles of our organization and should be taken by the organ which is charged with the primary responsibility for the maintenance of peace, that is, by the Security Council. The principle of unanimity of the five powers as such is not an obstacle to the effective control of atomic energy, no matter how someone tries to prove the opposite.

What other principle can be proposed to us by those, who are sick of the principle of unanimity of the great powers, for the solution of all the important questions involved in the maintenance of peace, including the question of sanctions? What "substitute" can they propose instead of "veto"? Don't they want to draw us back to the ruins of the League of Nations? One may not answer these questions, gentlemen, but we cannot get away from them.

UNESCO Holds First General Session in Paris

◆ **Report of the UNESCO Conference in Paris, and the Natural Sciences Subcommission's plan.** . . . ***by W. Albert Noyes, Jr.***

The first meeting of the general conference of the United Nations Educational, Scientific, and Cultural Organization was held in Paris beginning on November 19, 1946. Forty-eight different nations had either official delegates or observers at the conference.

The chairman of the United States delegation was William Benton, Assistant Secretary of State for Public Affairs who, however, did not arrive in Paris until Nov. 22, several days after the official start of the conference. The deputy chairman was Archibald MacLeish, former Assistant Secretary of State. The three other voting delegates were: Arthur H. Compton, Chancellor of Washington University, St. Louis, Mo.; Anne O'Hare McCormick, member of the editorial board of the New York Times; and George D. Stoddard, President of the University of Illinois. The five alternate delegates were: Chester Bowles, former administrator, Office of Price Administration; Milton S. Eisenhower, President of Kansas State College; Charles Johnson, President of Fisk University; Anna Rosenberg, member of the advisory board, Office of War Mobilization and Reconversion (who did not attend); and George Shuster, President of Hunter College. There were two Congressional advisers: James E. Murray, Senator from Montana and chairman of the Committee on Education and Labor of the United States Senate, and Chester E. Merrow, Representative from New Hampshire.

It is not necessary to list here the advisers to the United States delegation, of whom there were approximately 35.

The only representatives of science in the U.S. delegation were Dr. Arthur H. Compton, a voting member, and the writer, in great contrast to certain other nations, some of which had delegations which consisted almost solely of scientists. This was a somewhat anomalous situation for the allegedly most powerful scientific nation in the world.

Subcommission on Natural Sciences

Preparations for the meetings of this subcommission were admirably made by Joseph Needham, professor of Biochemistry, Cambridge University, senior counsellor on natural sciences of the preparatory commission, and his staff. The subcommission took action on sixteen principal points.

1 To do whatever is possible, according to the means which may become available, to meet the needs of the devastated areas in scientific and technological apparatus and equipment, including purchase and shipment, and having special regard to the availability of war surplus which might be of use.

Since UNESCO is not a peace-making body, it can have no direct responsibility for fixing reparations. It was finally agreed that the United Nations would be requested to seek reparations in the form of scientific apparatus, such apparatus to be withdrawn from commercial or governmental stockpiles but not from research institutions where it would be used. In other words, it was the feeling of the meeting as a whole that the scientific effort of ex-Axis powers should not be diminished unnecessarily.

2 To establish a series of field science cooperation offices in those regions of the world remote from the main centres of science and technology; starting in the first place with four (Far East, Middle East, India and Latin America); each to consist of scientific men engaged in every type of liaison work which will assist the scientists of the region, having special regard to the raising of the standard of life of the nonindustrialized peoples. The hope that additional ones would soon be started in Africa and in eastern Europe during 1946 was expressed.

3 To assist in every way possible the work of the International Council of Scientific Unions and the specialized unions which it federates.

4 To set up international advisory councils in the engineering, medical, and agricultural sciences, by inviting representatives from each of the existing international organizations in these fields, together with representatives of the relevant UN specialized agencies and other interested bodies.

5 To explore all possibilities of improvement of the present situation in scientific literature, e.g., (a) by ameliorating the present serious position in circulation of books and periodicals, (b) by calling a world congress to consider rationalization of scientific publishing and abstracting, (c) by arranging for the photolithographic reproduction of back runs of the most important scientific periodicals, (d) by organizing reprint stockpiles, (e) by assisting existing scientific microfilm and photostat services, etc., etc., etc.

This motion was extensively amended. Part (d) was omitted. A new part (e) was added as follows: "that measures be taken to establish uniform scientific terminology in countries using the same or allied languages."

6 To assist scientific work of international interest by grants-in-aid directly or through the relevant international scientific union, and by sending technical or scientific assistance with the agreement of national institutions, amongst the kinds of assistance envisaged being (a) the support of type-culture collections leading to the preparation of world catalogue of strains maintained; (b) grants toward selected expeditions; (c) multi-search groups; (d) existing international laboratories (Naples, Jungfraujoch, Roscoff); (e) certain national institutions carrying on work of international significance and social relevance.

7 To assist the dissemination of essential research equipment and material exchanges, notably by operating a scientific apparatus information bureau and by adopting measures to overcome difficulties arising out of exchange difficulties.

The need for this activity is obvious but may not be fully appreciated by most Americans. Difficulties of obtaining money to purchase apparatus in foreign countries is a very real one in large parts of the world today. Moreover, those of us

W. Albert Noyes, Jr., is Adviser to the U.S. Delegation to the First Chemical Conference of UNESCO, and President of the American Chemical Society.

who are annoyed by salesmen all the time have some difficulty in understanding how little information on new apparatus is available in some countries.

8 To assist the development and circulation of scientific cinema films, for research, teaching, and popularization purposes, not only by keeping records, but by arranging for the provision of titles and soundtracks in many languages.

9 To assist the travel of scientists themselves across national boundaries, (a) by financial assistance along selected lines; (b) by exploring the possibilities of letters of credence or "cartes d'indentite;" (c) by encouraging the formation of "foyers des savants" in the principal cities; (d) by facilitating the transport of scientific instruments and documents carried by scientists when traveling.

The need for this activity is evident to anyone who has traveled throughout the world without the benefit of diplomatic passports, military help, etc. The matter of carrying biological specimens or even a microscope for personal use is extremely complicated due to customs barriers. UNESCO can perform a real service along these lines with a very modest expenditure of funds.

10 To explore the possibilities of the foundation of new international scientific laboratories and observatories, notably in (a) astronomy, (b) nutritional science, (c) meteorology, (d) applied mathematics, (e) tropical life and resources (Amazon basin), (f) health; furthermore to investigate the feasibility of smaller projects such as international stockrooms for (a) pure substances not commercially obtainable, (b) plastics and other materials useful in laboratories, (c) radioactive isotopes (d) pure strains of animals, (e) collection of plants.

Dr. Huxley felt quite strongly that the establishment of a bird sanctuary at Heligoland would create a worthwhile monument to UNESCO, might prevent the use of the island for military purposes, and would, in any case, require a very limited expenditure of money. It was agreed to add the word "ornithology" as (g) in the first list so that the matter would be considered when and if further funds become available for projects of this type. Another amendment proposed by the delegate from India was adopted: (h) oceanographic and fisheries institute for the south ocean based on Ceylon.

This whole item was discussed at very great length since it contains, more than any other, the elements of a program which would place UNESCO in the category of an operating agency. This was deemed essential by many delegates, since a mere fact-finding and surveying organization would recall the weaknesses of the period following the last war. It was fully realized that budget limitations would prevent an extensive program for the first year.

11 To take the necessary steps to begin the compilation of a world register of scientific institutions and scientists.

12 To collect up-to-date information on what the individual nations are doing with respect to the sending and reception of scientific personnel, to take responsibility for the completion of the UNRRA fellowship program (if this devolves upon UNESCO), to administer any fellowships which may be given to UNESCO by special benefactions such as that of the American Chemical Society, and to institute a certain number of fellowships.

13 To cooperate with, and advise when requested all the other elements in the UN structure—the Economic and Social Council, the other councils, and the other specialized agencies.

14 To aid the work, in every way possible, of the smaller, more specialized, international organizations.

15 To do whatever may be possible to inform the public of all countries on the possible bearing of scientific discoveries on international and social relations—e.g., by the publication of pamphlets, aid to, and correlation of, science news services, etc.

16 To give whatever aid may be feasible to science museums, and to consider the preparation of traveling science exhibitions, travel panels etc., etc.

Budgeting the Program

It is believed that the items which were approved constitute an eminently worthwhile program, one which will go far to make UNESCO a living organization and not a weak imitation of the bodies which were started at the close of World War I. However, any program requires money and the problem of the budget is related to a host of international problems. The Subcommission on Natural Sciences approved the budget prepared by the Secretariat calling for an expenditure of $1,096,553 during 1947.

Personalities Participating

A brief discussion of the personalities in the science subcommission and in the secretariat would be of interest. The presiding officer of the sessions on science was H. J. Bhabha, director of the Tata Institute of Fundamental Research in Bombay, who did a superlative job of directing the discussion. He is a brilliant physicist in his own right. Miguel Ozorio de Almeida of Brazil was elected vice chairman and Pierre Auger of France as reporter. Since the latter was forced to attend sessions of the executive board which often occurred simultaneously with those on science, Marcel Florkin of Belgium, president of the Seventh Congress of Biochemistry, was elected as alternate. He left before the final presentation to the program commission, and the writer had to pinch-hit at the close.

One fact must not be overlooked in any gathering of scientists. Many of them know each other's work and many have been close personal friends for years. This at once made for an atmosphere quite different from that in some of the other commissions and particularly in the higher echelons. A few names may be mentioned in passing. Sir Robert Robinson of Oxford, president of the Royal Society, was one of the principal British delegates. However, he was unable to stay in Paris during the meeting of the Subcommission on Natural Science and the United Kingdom representatives were P. M. S. Blackett and Sir Alfred Egerton. The scientific representatives of France were Pierre Auger and F. Joliot-Curie, although Professor Delaby and others were advisers and often attended. The Canadian representative in science was R. K. Lamour of the National Research Council. In addition to Professor Florkin, Belgium was represented by Jean Brachet. Brazil sent a particularly strong delegation in science. Australia, China, New Zealand, Greece, and many other countries had very able representatives.

Senate Atomic Energy Committee Hearings

(Continued from Page 78)

Research and Development (which he headed) and the Atomic Energy Commission.

The Chairman: Dr. Bush, it occurs to me that in OSRD there was one very vital factor, and that was the factor of almost inviolate secrecy. The development of atomic energy must give the greatest possible latitude to investigation and progressive development of this science, but there are still some elements of secrecy that I think must be maintained.

Dr. Bush: We are very proud that during the war, when this organization was handling matters of great secrecy, we had no important leaks. We did not even have cases of gross carelessness. We most certainly had no case of disloyalty within the organization. In the post war period, we have similar problems. We have, in view of the need for maintaining the security of this country, carefully guarded certain secrets. They must be well guarded. At the same time, we have the problem of furthering science in this country, for this country cannot operate in competition with the world in conducting science in secret. The very essence of scientific progress is the interchange between scientists.

The maintenance of a proper balance between those two things—strict secrecy where it should be maintained, and proper flow of scientific knowledge where it will benefit this country—is a matter on which you should have the finest of judgment.

And I am glad that a group of men has been gathered together in whom I have complete confidence as they approach that matter.

I want to say that Mr. Carroll L. Wilson, as my executive officer of OSRD, throughout the war handled such matters with skill, tact, and judgment.

The Chairman: I take it that Mr. Wilson has a highly successful experience in supervising not only immediate activities under him, but in the placement and supervision of contracts of subcontractors in that field?

Dr. Bush: Very extensive, because that is the way we operated throughout the war. The contracts were necessarily unusual. They called for a performance in an unknown field. There were contracts with universities, research organizations, industry; in which were brought together the efforts of engineers, scientists, industrialists.

There is a great parallelism between that effort and that which is before the Atomic Energy Commission.

The Chairman: Do you feel that, as the law is now written and stands, the establishment of a Division of Military Applications under the Commission, and the establishment of the Military Liaison Committee, create any necessity for apprehension that the military is taking over or is apt to take over the activities of the Commission?

Dr. Bush: I have felt throughout this entire affair during the past eighteen months that this whole hue and cry was more or less absurd.

We do not need emphasis of civilian versus military in this country. We need emphasis on collaboration. I think it was wise to set up a division on military applications. I feel confident that the relations between the military and the civilian commission can be worked out very smoothly. I am, in fact, involved in that matter, since I am chairman of the joint research and development board established by the Secretaries of Army and Navy to coordinate the programs of the Army and Navy in research and development.

Dr. Bush took pains to record a comprehensive endorsement of appointees to the Commission.

On February 7, **Dr. Karl T. Compton** strongly endorsed his former assistant, Mr. Wilson, as general manager. He also praised Dr. Bacher and Mr. Lilienthal. (A most emphatic endorsement of the latter was contained in a letter by Dr. Compton read into the record by Senator Vandenberg on February 21, (see page 75).

Acheson and Patterson Defend Lilienthal Report

On February 10, the testimony of **Dean Acheson,** Under Secretary of State, brought out some interesting information on the Acheson-Lilienthal Report.

Mr. Acheson began with a tribute to Mr. Herbert Marks (the present Chief Council to the Atomic Energy Commission, who was under particular fire from Senator McKellar), as a man of "highest character and integrity."

He quoted a letter from Mr. Chester Barnard, expressing concern "that so little public recognition was given to the great contribution of Mr. Marks to the report on The International Control of Atomic Energy."

As to aspersions on Mr. Marks' loyalty, Mr. Acheson said, "I would stake my life and my reputation on the fact that all of those allegations are untrue."

Senator Knowland asked why the Acheson-Lilienthal report contained no reference to the veto.

Mr. Acheson: All of these questions were discussed. But the question of how you enforce compliance is a separate question from the one which we were working on.

The problem given to us by the Secretary of State was: Assuming that you are going to have international control of atomic energy, what do you control?

To what extent is national secrecy and control possible in an international system? How do you reconcile private enterprise and research with international control? The problem of what you do with a violator is a matter for statesman who are organizing international forces to repress that illegal action.

Senator Vandenberg: I happened to have been with the Secretary of State at the time this Commission was launched.

It did not occur to me, I must say, that the absence of a discussion of the veto was any reflection on the report.

Senator Johnson: Mr. Chairman, in my opinion the Acheson-Lilienthal report is the greatest blunder in diplomacy that this country has ever made.

Its timing was bad. It was embarrassing to this committee that was working upon the political controls at the time. It was embarrassing to the United Nations Commission, working out international control of atomic energy.

Mr. Acheson: When this report was made by our committee to the Secretary of State, it was a secret document. We

gave your Committee copies of this report, and we explained what was in the report.

The next morning, practically a full account of the report appeared in all the newspapers. It was perfectly foolish to keep secret a document the main parts of which had been published.

The Chairman: I asked a newspaperman where that information came from. His statement to me—and I have no reason to disbelieve it—was that it came out of the State Department.

Senator McKellar then proceeded to attack the report as proposing to "give the bomb to Russia" and accusing Mr. Acheson of sympathy for communism. In the course of this questioning, the Under Secretary characterized the Soviet foreign policy as "aggressive and expanding"—a statement which later led to two Soviet protest notes.

Senator Vandenberg interposed a remark pointing out the suggested denaturation of fissionable materials as a major contribution of the Acheson-Lilienthal report, to which **Senator Johnson** answered that according to his information the denaturation theory is "completely fallacious" and a "hoax." (The two statements show how difficult it is for scientists to convey carefully weighed opinions to politicians, accustomed to thinking and speaking in extremes.)

On **February 11**, the Secretary of War, **Robert L. Patterson**, stated: In my opinion, the five members appointed to the Commission, and also Mr. Wilson, the manager, are thoroughly qualified for these most important posts; qualified by character, ability, and loyalty.

Senator McKellar: Have you examined the plan that is proposed by Mr. Lilienthal for the establishment of the Atomic Energy Commission? Are you in favor of setting up a super-government like this?

Secretary Patterson: I am in favor of international control of atomic energy, with a view to its abandonment as a weapon of war and its development for other purposes, under effective safeguards. I think the United States Government and most of the American people favor it.

Chester Barnard, President of New Jersey Bell Telephone Company, gave an enthusiastic endorsement to Mr. Lilienthal. He stressed Mr. Lilienthal's abhorrence of centralized government and recalled how in September 1945, when Mr. Lilienthal heard about the regimentation of life which might become necessary under the conditions of atomic armaments race, he said, "If it requires a totalitarian regime to control atomic bombs, I hope one drops on me and my family. I do not want me or my descendants to live in a totalitarian society." He described Mr. Lilienthal as eager to reduce the powers of the Atomic Development Authority, while representatives of the industry, such as Messrs. Thomas and Winne, were prepared to give it a much wider authority over academic and industrial research.

In discussing the publication of the Lilienthal report, he said that the original version still is secret, and that the committee prepared a revised version for possible publication, but had nothing to do with its actual release to the press.

Senator Connally submitted that the accent on peaceful utilization of atomic energy in the Acheson-Lilienthal report is caused by profit motives which should not be considered as important because of the military angle and of the doubtful industrial value of atomic energy. **Mr. Barnard** answered that security was the paramount purpose of the Lilienthal plan.

The Chairman: And I take it that the reason you are supporting this report and the Baruch plan, is the hope that by establishing some sort of reliable plan such as this, with definite controls and safeguards, we can stop the private or individual experimentation in the production of bombs by other nations and concentrate that in a group over which we have some control; is that correct?

Mr. Barnard: Yes, sir. That is correct.

Mr. Harry Winne, Vice President of the General Electric Company, also explained and supported the Lilienthal-Acheson-Baruch plan for international control. He added:

I am much concerned by the delays and the confusion and uncertainty which have existed to a considerable extent, first between the date of the passage of the Atomic Energy Act and the appointment of this interim commission.

Our own project was delayed a considerable amount. I mean the General Electric project.

Now, since these hearings have started, again I feel that there is confusion and delay which may be dangerous in our international relations.

The Chairman: There was a delay in the appointment of the commission for almost as long a time as the committee and the Senate deliberated on writing the bill, and the commission was not appointed until about November 1st.

This Congress did not meet until the 3d of January last. We have taken approximately two weeks, or three, perhaps, with hearings twice a day, and this subject has been rather opened up because of the curiosity and the lack of knowledge on the part of the American people, and even of the Congress, and I do not believe the Congress can be accused of unduly delaying the examination into this very vital thing.

Senator McMahon: In a talk I had with some of our military people, one of the things that they regretted the most was that the American people had not had sufficient education as to the implications of this situation. It seemed to me they were somewhat critical of me as Chairman of the Senate Committee because we had not gotten out more to the people as to what the implications were.

People are interested in personalities, and while it is true that seven-eighths of this has not been about what these men are going to administer, nevertheless a good many people probably have begun to absorb some of the problems that are implied in the atomic energy field.

There are a lot of people in this country who still believe, because they have not studied it, that all you have to do is to keep the secret.

No transcripts were available, at the writing of this report, on the last ten days of hearings. On February 19, **Dr. Charles A. Thomas**, Vice-President of the Monsanto Chemical Company and another member of the Board which prepared the Lilien-

thal report, vigorously defended the report and, like other witnesses, was attacked by Senator McKellar for wanting or perhaps having already "given the secret to Russia." Dr. Thomas tried to teach Senator McKellar some elementary facts of physics pertaining to the "atomic secret," but did not get very far.

Senator McKellar as Guest Prosecutor

By February 1, the Committee seemed to be ready for a vote. The intervention of Senator McKellar—who is not a member—made possible by the courtesy rules of the Senate, has dragged the proceedings out for another five weeks.

The subject of Senator McKellar's accusations—the outgrowth of an old enmity of the Senator from Tennessee, an original sponsor of the TVA, against a director of the TVA who became too independent—were (1) the alleged Communistic sympathies of Mr. Lilienthal, and (2) his "dictatorial" administrative practices.

Alleged communistic activities in the TVA were the subject of a Dies Committee investigation in 1940, and the present attacks of Senator McKellar proved only a rehash of the accusation discredited in this earlier inquiry. The story of this investigation was told to the Committee on February 16 by former Representative Joe Starnes of Alabama.

Mr. Starnes strongly commended Mr. Lilienthal as a man of impeccable character, an able administrator, a good executive, a man of vision, character, energy and realism, and stressed the great credit due him for the success of TVA. He testified to the absence of any charge of Communist sympathies on the part of Mr. Lilienthal before the Dies Committee and to the satisfactory manner in which he and his administration had handled any suggestions of Communist activity within the TVA.

Despite Mr. Starnes' authoritative statement, Senator McKellar continued his attempts to build a case against Mr. Lilienthal and his co-workers, particularly Mr. Herbert Marks, appointed as Chief Counsel by the Commission. A letter, allegedly written by a young TVA Communist, Mr. Hart, in 1929, to a communist organizer in Birmingham, was the subject of extensive questioning. The letter bragged that the dismissal of a Mr. Smith, head of the files section at the TVA, for incompatibility with the employees, was brought about by Communist influence with the higher-ups in the TVA.

After extended testimony on the issue of Communism in the TVA, amply exploited in the daily press, the very authenticity of the Hart letter seemed highly doubtful, and Senator McKellar's principle witness, Robert F. Barker, former investigator for the Dies Committee, was threatened with a perjury charge.

These accusations lead to the appearance of several character witnesses for Mr. Marks, including the Under Secretary of State, **Dean Acheson**, the Counsel to the War Production Board, **John Lord O'Brian**, and **Dr. John S. Dickey**, President of Dartmouth College.

In support of his other accusation against Lilienthal—his "dictatorial administrative practices"—Senator McKellar put on the stand, on February 11, **Dr. A. E. Morgan**, first Chairman of the TVA, whose bitter conflict with Mr. Lilienthal was resolved by President Roosevelt in favor of the latter. At the end of Mr. Morgan's testimony, Senator McMahon brought out that practically all the incidents presented were already investigated in 1938 and that none of the charges against Mr. Lilienthal were sutained by the investigating joint committee of the Congress.

* * *

A number of witnesses from different walks of life appeared to endorse Mr. Lilienthal. Among them, **Reverend O'Connell**, past President of the Catholic Committee of the South, endorsed the philosophy of Mr. Lilienthal by quoting the review of his book "Democracy on the March" by Reverend Gavin, S. J. which stressed its similarity with the Catholic teachings (as expressed in Pius XI's Encyclica *Quadragesimo Anno);* he also quoted the Catholic Committee of the South's award to Mr. Lilienthal in 1946. **Bishop E. M. Hughes** of the Methodist Church also praised Mr. Lilienthal highly.

Twelve prominent citizens of the Tennessee Valley — farmers, industrialists, editors — appeared to express the high esteem in which Mr. Lilienthal is held in the Valley, and the general approval of the work done by the TVA under his direction.

Confirmation Becomes a Public Issue

While disclaiming association with Senator McKellar's campaign, a number of prominent Republicans have joined in opposition to Mr. Lilienthal's confirmation, and this converted it into a major political issue. The accusation from this side was not disloyalty or communistic dealings, but the economic philosophy of Mr. Lilienthal—his close association with the New Deal and his alleged belief in public power ownership. While representatives of the industries with some experience in the field of atomic energy (General Elctric, Monsanto, Bell Telephone Company) have strongly endorsed Mr. Lilienthal and the principle of national management of atomic energy development, a "lobby" of private power interests was reported to be campaigning against him, apparently in the long-range apprehension that Mr. Lilienthal may be successful in developing atomic power until it becomes a serious competitor to other power sources. Whether under the influence of this lobby, or because of their own dislike of public enterprises and apprehension that Mr. Lilienthal is the one man most likely to make such a public enterprise a success, several influential Republican Senators, such as Taft and Wherry, have announced their opposition. Mr. Taft issued a statement in which he called Mr. Lilienthal "a power-hungry bureaucrat" who is "soft to communists" and whose philosophy is contrary to that of the majority of Americans as expressed in last year's elections.

Mr. Lilienthal was openly supported by several more liberal Republicans, such as Senator Lodge, by the Federation of American Scientists, the scientific staff of the Los Alamos Laboratory, the Oak Ridge Association, etc. and by all groups which have joined the scientists in last year's fight for civilian control of atomic energy.

It can safely be stated that scientists were overwhelmingly in favor of Mr. Lilienthal's appointment and highly apprehensive of the effect his rejection by the Senate would have on the scientific personnel of the Atomic Energy Commission.

(Continued on Page 98)

Disarmament and Atomic Energy in the Security Council

(Continued from Page 91.)

On *March 10*, the Security Council reconvened — in an atmosphere rendered tense by the vehemence of Gromyko's speech of the previous week—to reconsider referring of the Atomic Energy Report back to the Atomic Energy Commission.

Senator Austin, referring to the "defamation and innuendo" of Mr. Gromyko's statements, flatly rejected the Soviet proposals, declaring that they did not insure an international system of control of atomic energy, as Gromyko claimed. "They provide," said Mr. Austin, "for a system which at best would give no security, and at worst could be a constant incentive to distrust and war." Charging that the proposed Soviet plan would encourage national rivalries, he further declared:

"Because the United States believes that national rivalries would create secrecy, suspicion, and finally preparation for the horrors of atomic war, it has proposed to turn over in due course all its knowledge, its facilities and its scientific skills to an international agency.

"The United States does not desire to impose its will, in questions of atomic energy, on other countries, The (Commission's) report itself proves the opposite. Ten countries united therein to forestall an atomic-weapons race."

Austin Revises Resolution

Senator Austin had revised his covering resolution of February 25th, to omit the optimistic references to the large areas of agreement indicated in the report, and the resolution, upon which unanimous agreement was finally reached, read as follows:

The Security Council, having received and considered the first report of the Atomic Energy Commission dated 31 December, 1946, together with its letter of transmittal of the same date,

Recognizes that any agreement expressed by the members of the Council to the separate portions of the report is preliminary, since final acceptance of any part by any nation is conditioned upon its acceptance of all parts of the control plan in its final form;

Transmits the record of its consideration of the first report of the Atomic Energy Commission to the Commission;

Urges the Atomic Energy Commission, in accordance with the General Assembly resolutions of 24 January and 14 December, 1946, to continue its inquiry into all phases of the problem of the international control of atomic energy and to develop as promptly as possible the specific proposals called for by Section 5 of the General Assembly resolution of 24 January, 1946, and by the resolution of the General Assembly of December 14, 1946, and in due course to prepare and submit to the Security Council a draft treaty or treaties or convention or conventions incorporating its ultimate proposals;

Requests the Atomic Energy Commission to submit a second report to the Security Council before the next session of the General Assembly.

Debate Final Form

In the long debate that preceeded the vote on the resolution, much attention was given to the paragraph recognizing that "final acceptance of any part by any nation is conditioned upon its acceptance of all parts of the control plan in its final form." Mr. Gromyko's motion to delete this statement was supported by France, Poland and Syria, but was finally rejected by a vote of 6 to 4. Mr. Austin wished to make sure that in the final showdown the USSR would have to accept or reject the plan as a whole.

Debate also centered about the question as to the form in which the final plan of control should be presented. Mr. Gromyko claimed that the General Assembly Disarmament Resolution specified a "convention or conventions" while Mr. Austin maintained that it specified a "treaty or convention" and that a treaty was regarded by the Constitution of the United States as the proper form for so important a matter.

An acrimonious exchange followed, during which Mr. Gromyko pointed out that all the 54 nations signing the disarmament resolution had constitutions, and they finally agreed to use the phrase "a draft treaty or treaties or convention or conventions."

Some hope was expressed that the Atomic Energy Commission might be more successful than the Council has been in persuading the USSR to accept the basic principles of the US control plan, despite the fact that the membership of the Commission and the Council are almost identical. Canada is a member of the Commission, but not of the Security Council.

None Support USSR

The grave concern aroused by Mr. Gromyko's unconciliatory attitude was generally felt by members of the Security Council, none of whom expressed support of the Soviet stand. Alexander Parodi, the French representative, warned of the inevitability of an atomic armament race if atomic power is allowed to develop along nationalistic lines, and deplored the crisis of confidence that has marked the course of world events and the work of the Security Council.

Both M. Parodi and Dr. Quo Tai Chi, of China, pointed out that the Commission had adopted its report by a vote of 10 to 0, which did not support the charge of a monopolistic plan undertaken by the United States alone.

As of January 1st the place of the Netherlands, Mexico and Egypt on both the Commission and the Council have been taken by Belgium, Columbia and Syria.

Gromyko Chairman

As chairman for this month of the Atomic Energy Commission Mr. Gromyko will be responsible for the calling of the next meeting of the Commission, in whose hands now lies responsibility for reconciling the important differences represented by the US and Soviet stands. The last paragraph of the resolution, calling for a second report from the Commission before the convening of the General Assembly, allows the Commission's efforts to reach agreement to drag on until September 25th.

Reducing Vulnerability to Atomic Attack

(Continued from Page 74)

ods of protection back through the industrial complex supporting the production of finished munitions. However, it is unlikely that a complete industrial organization from raw materials to finished product could be so designed as to withstand an assault by X,000 bombs. "Complete" protection should be provided as far back as practicable, with large stockpiles of input materials maintained at the earliest protected stage.

Vulnerability Reduction as a Means of Minimizing Loss of Life

In some ways, the protection of military strength would be no more difficult when armament was unlimited than when an agreement prohibited atomic weapons. The larger scale and earlier incidence of atomic attack would be in part compensated by the economy resulting from our own employment of extremely efficient weapons; furthermore, there would be fewer inhibitions to restrain the establishment of safeguards.

But in seeking methods for minimizing death and destruction, there are no compensations for the probability that attack would be early and massive. It is difficult to outline measures which would reduce deaths below seven or eight figures if X,000 bombs were delivered on the most densely populated areas of the United States. A drastic program of dispersion of urban populations would decrease the probable number of casualties; but unfortunately, since the estimated cost of an atomic bomb is only $1,000,000, it would presumably be easier for other powers to add to the strength of their attack than for this country to increase the number of targets by building smaller cities. The degree of decentralization which would be needed in order to make the casualties no greater than, say, those caused by allied bombing of Germany is probably a greater degree than would be feasible under a democratic government, if indeed *any* conceivable dispersion could make casualties so few.

To say that massive casualties could not be avoided by protective measures is not to say that precautions would be worthless. Every means available should be exploited for inducing a less concentrated pattern of habitation. Large, deep shelters should be constructed underground. Food stocks and other stores should be accumulated in protected places of storage. Structural features resistant to the properties of atomic explosives should be encouraged. However, one should not anticipate that such measures would avert an extremely large number of deaths and injuries in a several-thousand-bomb attack.

The foregoing discussion has attempted to describe one facet of the problems arising from the current revolution in warfare: specifically, the reduction by protective methods of the potential consequences of atomic attack.

Even in the description of this single aspect, there have been simplifying assumptions, stated explicitly or implied, which have made the analysis easier, but which unfortunately do not in any way reduce the difficulty of the problems themselves. For example, no account has been taken in this discussion of potential improvements in atomic bombs; yet there is convincing published testimony that substantially larger and more efficient bombs may be feasible. Little mention has been made of the possibility of novel methods of employing atomic bombs—methods, for example, that might make use of radioactive products with protracted lethal properties. The question of vulnerability to bacteriological or other organic poisons has been totally omitted. In point of fact, such technical possibilities should have a determining influence on plans for vulnerability reduction.

Similarly, the pragmatic political and economic barriers to the formulation and implementation of protective plans have been almost entirely overlooked, as have been the effects such plans would have on political and economic life.

This discussion has been concerned—in each set of assumptions—with an era which would begin in the near future and might extend for a few years—one or two decades. In the more distant future, it is to be hoped that the present highly concentrated spatial pattern of industrial nations—a most vulnerable arrangement—will be gradually readjusted. But unless in some way there is a limitation imposed on atomic weapons, any readjustment may well be overcome by increases in the number and effectiveness of the atomic bombs in the arsenals of the world.

The Senate Committee Approves Lilienthal

(Continued from Page 96)

On *March 10*, Mr. Lilienthal's appointment was approved by the Senate Committee by a vote of 8 to 1, with Senator Bricker casting the dissenting vote. Senator Bricker claimed that his opposition was not political but was based on his conviction that "radicals, pinkos, or ultra-liberals are working in and about the atomic energy project." He stated that Federal Bureau of Investigation records, made available to the Senate Committee, showed that some of the men already appointed by Lilienthal and Wilson "are subject to serious question as to their loyalty to our form of government." Bricker asserted that Herbert S. Marks, general counsel to the Commission, had been denied a commission in the Navy because of his "associations."

The appointments of Mr. Strauss, Mr. Waymack and Dr. Bacher were approved by a vote of 8 to 0, and those of Mr. Pike and Mr. Carroll Wilson by a vote of 6 to 2. Senator Connally refused to vote on anyone but Mr. Lilienthal, saying that he did not know enough about the candidates.

Senator Bricker and Senator Johnson voted against Mr. Pike and Mr. Wilson. Bricker explained that he considered Mr. Wilson to be the "alter ego" of Mr. Lilienthal. The two senators did not explain their opposition to Mr. Pike, but it was thought to be related to Mr. Pike's former affiliation with the New Deal agencies, the Securities and Exchange Commission and the OPA.

Chairman Hickenlooper declared that in voting for Mr. Lilienthal he had voted for what he conceived to be "the immediate best interests of our atomic energy program and of the United States." Hickenlooper emphasized that the evidence presented before the Committee had thoroughly established the character and abilities of Mr. Lilienthal and complete absence of the Communist sympathies of which Senator McKellar had tried so hard to convict him.

Senator McKellar announced his determination to wage a fight to the finish on the Senate floor against Lilienthal's confirmation.

The Beginning or the End: A Review . . .

. . . . . by Harrison Brown

I VISITED HOLLYWOOD for the first time about ten years ago. After an all-day drive down the coast from San Francisco, we reached Los Angeles at dusk. Driving down Wilshire Boulevard upon our arrival, we saw an extraordinary sight. A man strolled out of a luxurious appearing apartment house on our right. In the man's hand there was a leash, and at the end of the leash there was a duck, amiably waddling along beside his master.

The duck was wearing shoes!

It is difficult to describe my emotions while viewing that scene. I felt as if I was viewing something in a dream—a dream in which fantasy is superimposed upon reality to such an extent that the result can only be described as ludicrous.

By the time the first reel of "The Beginning or the End," MGM's saga of the atomic bomb, had passed before my eyes, my thoughts had returned to the scene of the duck with shoes. I had the feeling that I was viewing a grotesque reality. I had the feeling that both the duck and his master might have contributed, at least to some extent, to the production of the picture.

In all honesty it must be said that the film as a whole is of poor quality. Many events are misinterpreted, many of the characters are poorly depicted, and the usual modifications-of-history-to-fit-the-situation have been made.

Picture Should Be Seen

In at least one instance, history has been altered to the point where extremely dangerous impressions are given. And yet, with equal honesty it must be said that "The Beginning or the End" is a picture that should be seen by every man, woman and child in this country.

In spite of its shortcomings, the picture has its points of excellence, and it is, at the present time, the only means by which the greater part of the American population can be given at least some feeling as to what atomic bombs are, what they can do, and what they may mean to the society in which we live.

It is extremely difficult for a scientist, particularly one who has been associated with atomic energy developments for an appreciable period of time, to give a fair judgment on this picture. The first time I saw it, I was constantly being jolted by sudden appearances of actors portraying acquaintances, by the inconsistencies of technical detail, by the improper interpretation of events and by outright falsifications of history. The succession of jolts prevented me from appreciating the picture as a whole.

It was, therefore, necessary for me to view the picture a second time before writing this review. During the second viewing the jolts were milder, and my general impressions as to the value of the picture were considerably elevated.

A picture such as "The Beginning or the End" must be looked upon from three points of view. First, forgetting about history, character portrayal, and educational value, how is it as a motion picture? Second, how accurately does the picture represent the facts? Third, and most important from the point of view of the atomic scientists, what sort of an over-all impression will be given the American public as to the dangers that we face?

Opinions of "The Beginning or the End" purely as a motion picture relative to other motion pictures should be left to the more experienced professional critics. I personally consider it poor. The love interest was insipid in the extreme.

Scientific Equipment Over-Glamorized

The picture portrays the events leading up to the bombing of Hiroshima on the whole, with reasonable accuracy, when due allowance is made for the difficulties of compressing five years into ninety or so minutes, for the difficulties of adequate character portrayal and for reasonable poetic license. There are a number of exceptions, however, that should be noted. For one thing, scientific equipment is over-glamorized. For example, the starting of the first nuclear chain reaction in Stagg Field was actually a very quiet event but it was apparently not sufficiently glamorous for MGM, for tons of additional equipment were added in the picture, and the sound effects would have been more adequate for the falling of the Walls of Jericho.

The misrepresentations of the actual sequence of events and of the events themselves are too numerous to discuss. In general, however, it must be said that these misrepresentations will probably not disturb persons who were in no way connected with the project. They do, however, give a completely false impression as to how scientists work and as to how the project progressed.

Falsification of History

The most horrible falsification of history was the insistence throughout the last part of the picture that Hiroshima had been warned of the approaching attack. It was stated in the scene in President Truman's office at Potsdam that warning leaflets would be dropped before the bomb was used. It was stated again by the crew of the plans carrying the first bomb to Japan, that Hiroshima had been pelted with leaflets for many days.

Actually, Hiroshima was a secondary target and had not been pelted with leaflets at all. Several other Japanese cities were warned of the possibility of destruction, but no mention was made in the leaflets of atomic bombs. No mention is made in the picture about the dropping of the second bomb on Nagasaki.

As to the overall impressions that may be given the American public by this picture, I believe that on the whole the impressions will be favorable. The scene of the dropping of the bomb on Hiroshima is extremely effective (by far the best in the picture) and it cannot fail to leave an impression. I believe that the American people will receive from the picture, at least some indication as to what an atomic bomb attack may be like. Unfortunately, however, they are not given any clue as to what they, as individuals, can do about it. The picture ends on a distinct note of optimism in which it is stated in effect that somehow things will work out all right. The picture leaves one with the impression that so much good can come from atomic energy that it is sure to over-balance the evil....Just how this will happen is not explained.

BULLETIN of the
ATOMIC SCIENTISTS
1126 E. 59 St.
Chicago 37, Ill.

Editorial (Continued from Page 69)

Outlawry of Bombs

THE USSR still insists on immediate outlawry and destruction of bombs and has asked for deletion from the report of a statement that, by standing alone, such a convention would be useless. However, the sentence stays that the disarmament convention should be accompanied by the establishment of effective safeguards. An attempt to devise such safeguards will show that none can be effective unless extended to the production of fissionable materials—and thus the outlawry of atomic bombs will be tied up with the international control of atomic energy, however much the Russians want to separate the two.

Continued production of atomic bombs should be viewed—by both sides—in its proper perspective, as a problem mainly of symbolic and psychological importance. Dismantling of atomic bombs is not like scuttling of battleships. It has been repeatedly stated that even fully controlled peacetime development of atomic energy is equivalent to 75% of atomic military preparedness. Here prohibition of the assembly of bombs could not prevent a nation, possessing the necessary know-how, from remaining even much closer to its full military potential. It should, therefore, not provide a potential aggressor—as long as he himself has no atomic weapons—with an expectation of impunity.

Down to Real Issues

THE negotiations are now down to the real issues—those of inspection and management. We cannot expect the Soviet Union to agree to our proposals as rapidly and completely as did the other nations. But what we can request is no more delays or evasions. The issue is too urgent. It is now up to the Soviet Union to present a scheme of inspection comprehensive enough to put to rest all fears of clandestine developments. If such a plan is offered, it should receive fair consideration. But if effective control by inspection alone proves impracticable, the Soviet Union, if she is genuinely desirous of international control, as she says she is—will have to consider international management in a less doctrinal and more practical way. From outright rejection of international inspection, the USSR has progressed to bargaining about its scope; we must hope that from outright rejection of international management, the Soviet Union will advance to the consideration of how such a management can be set up without endangering her national economy.

Politics, Domestic and Foreign

Mr. Lilienthal is having a rough time. Some of our Senators look on him as the spearhead of communism in our country. They seem to think that a man who has made a success of a great industrial enterprise undertaken by the United States government is definitely dangerous.

The unconfirmed chairman of our Atomic Energy Commission is attacked from the other side with equal vehemence. He is responsible for a plan of inspection and Mr. Gromyko considers this plan as a blueprint for a gigantic international trust, the most abhorred products of capitalism. "It remains only," says the representative of the USSR, "to add to such a proposal the further suggestion that the international control organ should share profits of establishments under its management in accordance with the quantity of shares belonging to one or the other country."

We still hope that our Senators will be convinced that Lilienthal is not in the pay of Stalin and the Russians will notice that he is not the latest prophet of dollar-imperialism.

—Edward Teller

BULLETIN OF THE ATOMIC SCIENTISTS
EDITORS:
H. H. Goldsmith E. Rabinowitch
EDITORIAL ASSISTANT:
Virginia Penn

The Bulletin is published once a month by The Atomic Scientists of Chicago, 1126 E. 59 St., Chicago, Ill., under the sponsorship of the Emergency Committee of Atomic Scientists. Subscription price—$1 for 6 months; $2 a year. Single copy—20 cents. PLEASE report change of address direct to the Bulletin, allowing 4 weeks before change is to take effect. Manuscripts should be sent in duplicate to H. H. Goldsmith at the above address.